**AT&T**

# 5620 Dot-Mapped Display
Release 2.0
User Guide

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# Chapter 1

# INTRODUCTION

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**Chapter 1**

# INTRODUCTION

## GUIDE OVERVIEW

This guide explains operation of the TELETYPE* 5620 Dot-Mapped Display (DMD) terminal when equipped with the Core Utilities Package - Release 2.0.

This guide is organized as follows:

- Chapter 1, "INTRODUCTION," explains general information about this guide and the DMD terminal.

- Chapter 2, "GETTING STARTED," outlines required and optional steps to be done prior to using the DMD.

- Chapter 3, "LAYERS ENVIRONMENT," details how to enter and manipulate the layers windowed environment.

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- Chapter 4, "APPLICATION PROGRAMS," describes and explains how to use the various Core Utilities Package application programs.

- Chapter 5, "THE JIM EDITOR," explains how to use the **jim** editor application program.

- Chapter 6, "PRINTER OPERATION," explains how to use the **dmdp** application program to drive DMD supported printers.

- Chapter 7, "GETTING OUT OF TROUBLE," explains what to do if something goes wrong.

- Chapter 8, "OPTIONAL SOFTWARE PACKAGES AND DOCUMENTATION," contains short descriptions of optional DMD software packages and related documentation.

- INDEX is an alphabetized subject listing with page numbers for easy subject location.


## DMD OVERVIEW

The DMD terminal is an intelligent, high-resolution graphics terminal designed especially for use with UNIX* System V (see the *5620 Dot-Mapped Display Product Overview* for supported computers, releases, and version numbers).  Instead of merely operating as an Input/Output (I/O) device to a UNIX System, the DMD creates an "operating environment" with the UNIX System.

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## Operating Characteristics

Operating characteristics of the DMD are determined by application software programs, not by specialized hardware. The hardware is designed to be "neutral" — it is not specialized to any particular task. For example, there is no hardware graphics assist for line drawing; nor is there any text character generator, or hardware to draw a cursor. Functions often performed by terminal hardware are performed by software as required by a particular application. The DMD can be configured for specific applications, without the constraints of conventional video display terminal hardware. The DMD operating characteristics change with the software that is in use at any particular time.

Basically, the DMD operates with the UNIX System in three different operating environments, shown in Figure 1-1.

| ENVIRONMENT | DESCRIPTION |
|---|---|
| resident terminal | The login environment |
| stand-alone | Single program environment |
| layers | Multiple terminal environment |

**Figure 1-1.  5620 DMD Operating Environments**

### Resident Terminal Environment

The resident terminal environment is the initial login state. Effectively, the DMD operates like a "dumb" terminal while in the resident terminal environment. Characters typed in at the keyboard are sent to the UNIX System, and characters sent from the UNIX System are copied to the DMD display screen. The resident terminal environment is not intended to be

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the normal operating environment; it is merely the starting and ending environment.

### *Stand-Alone Environment*

No other program runs in the DMD when a **stand-alone** program runs. A running **stand-alone** program does not depend on the UNIX System for normal Input/Output (I/O). **Stand-alone** programs do not need support from the UNIX System or host computer to perform their normal operation.

### *Layers Environment*

The **layers** program environment will be used by the average user more than any other. Most of the available DMD application software runs in ` **layers**. In the **layers** environment you can create and display up to six virtual CRT terminals at the same time. These layers (terminals) can overlap or completely obscure other layers on the screen. The mouse is used in **layers** to select menu entries, add, move, reshape, change, delete or exit layers, control cursor motion, and direct user activity.

### *Changing Environments*

Each change of the operating environment must go through the resident terminal environment. Changing from the **layers** environment to the **stand-alone** environment requires that you first exit **layers**, thus returning to the resident terminal environment, and then download the desired **stand-alone** program. You cannot go directly from **layers** to **stand-alone**.

## Users

Anyone familiar with the UNIX Operating System will find the DMD a powerful tool with very flexible environments for text processing, high resolution graphics, and software program development. New users will discover that friendly "pop-up" menus will guide them through operations quickly and easily.

A novice user can easily and quickly learn DMD basic operation by following this guide. Once familiar with basic operation, a user should only require reference to the supplied *5620 Dot-Mapped Display Reference Manual* manual pages for information.

Anyone intending to write programs for the DMD, must have the optional Application Development Package installed on their host computer (see Chapter 8). The UNIX System/DMD programming environment requires that the programmer be familiar with the UNIX Operating System and the C Programming language.

## The Software

The DMD product package includes software in the correct media for your UNIX System computer. Local procedures should be followed for software installation, as procedures can vary from location to location. See the *5620 Dot-Mapped Display Administrator Guide* for details.

The DMD software runs in two "parts." One part runs in the DMD itself; the other runs in the host computer. DMD application programs do not communicate directly with the UNIX System, as with conventional terminals. Rather, the user communicates with the program running in the DMD which, in turn, communicates with a program running in the UNIX System.

Programs are downloaded into the DMD from the UNIX System host. Once downloaded, the program can communicate with DMD peripheral devices (keyboard, mouse, printer, and RS232 port) and the UNIX System.

### Cursor and Character Generation

Cursor and character generation is done in software. This allows the DMD to display any shape mouse cursor that can be defined in a 16x16 pixel "bitmap." Application programs display different cursor symbols for visual feedback of program status. The optional **icon** program (part of Application Development Package) is used to create customized cursor symbols.

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## The Hardware

See your *5620 Dot- Mapped Display Terminal Owner's Manual* for a
detailed technical hardware description.  Hardware consists of a keyboard,
display unit, mouse, and interconnecting cables.  Printers are optional.

### Display Unit

The display unit (Figure 1-2) contains the *WE*\* 32100 Microprocessor,
memory (256K-byte or 1M-byte), Input/Output (I/O) ports, I/O port
connectors, AC power supply, intensity control, and an 8-inch by 10.24-
inch screen.  The display unit has a green phosphor screen with a
resolution of 100 dots (pixels) per inch.  Each dot on the screen can be
addressed separately which allows advanced display and graphics
capabilities.

### Keyboard

The keyboard uses the ASCII encoded character set, with programmable
function keys, cursor control keys, and a numeric keypad.  The detached
keyboard connects to the display unit through a coiled cord allowing
placement in any comfortable position.

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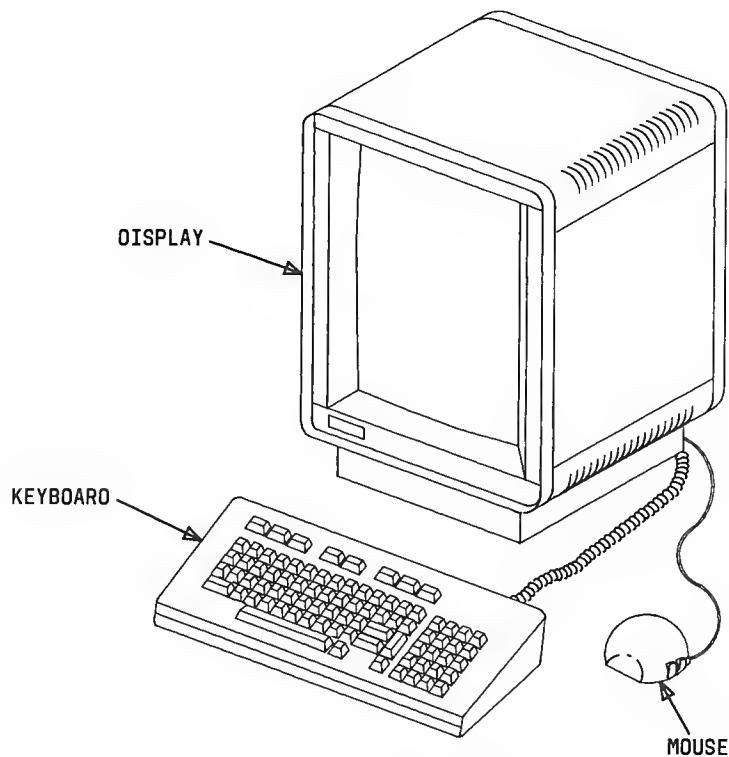
**Figure 1-2. The 5620 DMD Terminal**

## *Mouse*

The hemispheric-shaped mouse (shown in Figures 1-2 and 1-3) is used to control cursor movement, control user functions, display "pop-up" command menus, manipulate text, and generate and direct graphics activity.

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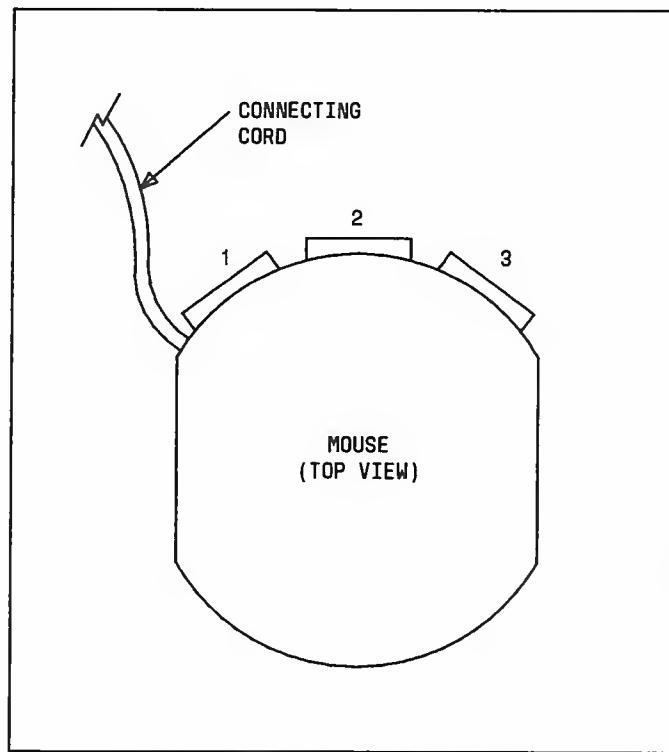
**Figure 1-3. The DMD Mouse**

> **Note:** The mouse can be configured for left-hand use. See your *5620 Dot- Mapped Display Terminal Owner's Manual* for details.

Mouse movement translates cursor movement into X and Y coordinate information to be processed by the software. Details for using the mouse are explained for each program application.

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## COMMENTS

If you have any comments or suggestions on this guide, please take a moment to fill out the comment card in the back. Your help makes better documentation.

# Chapter 2

# GETTING STARTED

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**Chapter 2**

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# GETTING STARTED

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## INTRODUCTION

The following steps outline what should or may be done before using the
DMD terminal. Each step references detailed information.

1. Connect and set up the terminal (plug it in, attach keyboard, mouse,
   cables, printer, etc.). See the *5620 Dot Mapped Display Terminal
   Owner's Manual*, which comes with the DMD terminal, for details.

2. Turn on power and adjust screen intensity. An automatic self-test is
   initiated. See the *5620 Dot Mapped Display Terminal Owner's Manual*.

3. Set terminal options (baud rate, keyboard tone, screen background,
   encoding, flow control, programmable function keys, etc.) as required
   or desired. See the *5620 Dot Mapped Display Terminal Owner's
   Manual*.

4.  Login the UNIX System.

    ***Note 1:*** Login and logoff procedures are dependent on the
    particular UNIX System, as with any conventional terminal.
    Follow local recommendations for login and logoff.

    ***Note 2:*** Many UNIX Systems have a "timeout" feature which
    will logoff a terminal if it has not been used for a specified
    amount of time. If your UNIX System uses a timeout feature,
    it must be disabled for proper operation of DMD programs.
    Contact your System Administrator to determine which logins
    must have the timeout disabled.

5.  Edit your **.profile** to include the necessary variables. See the next
    section of this chapter for details.

6.  Download the **layers** program and create a desired number (up to six)
    of layers. See Chapter 3 for details.

7.  Use each layer just like an individual UNIX System terminal and/or
    download DMD application programs into the layers. See Chapter 4
    for details.

# EDIT YOUR .PROFILE

The UNIX System must know DMD operating characteristics. The user must inform the UNIX System that a DMD is being used. The simplest method of doing this is to include the necessary information in your **.profile**.

Edit your **.profile** to include the following variables:

**TERM=dmd**
**DMD**=<root>
where <root> is the full path name of the DMD software installation point

Add **$DMD/bin** to your **PATH**
Export **TERM PATH DMD**

> ***Note:*** For Local Area Networks (LAN), if you have a DMD terminal previous to Release 2.0, include **DMDLOAD=hex** and **export DMDLOAD** to enable encoding. However, **jx** and **t5620** will not work in **stand-alone** in this case.

The next page shows an example of a typical **.profile** for a user with access to more than one terminal.

## Example of a Typical User .Profile

```
echo " Select Login Terminal:

    5420 = Teletype 5420
     dmd = 5620 Dot-Mapped Display
        o = Other (Dumb terminal)

TERM = \c "
read term
case $term in
5420)
stty tabs nl0 cr0 erase \ ̂H echoe
stty ixon
echo " TERM = Teletype 5420 - Use BACKSPACE to Erase"
TERM=5420
PATH=$PATH
;;
dmd)
stty tabs nl0 cr0 erase \ ̂H echoe
stty ixon
echo " TERM = 5620 DMD - Use BACKSPACE to Erase"
TERM=dmd
DMD=<root>  #<root> set to DMD root node.
PATH=$DMD/bin:$PATH
export DMD
;;
*)
echo " TERM = dumb, (UNIX System Default) - Use # to Erase"
TERM=dumb
PATH=$PATH
;;
esac
export TERM PATH
```

This sample **.profile** should be modified as required to correspond with local procedures. You may want to add (or change) terminals to reflect the local CRT requirements, and/or add to the terminal environment by including other options.

# Chapter 3

# LAYERS ENVIRONMENT

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# Chapter 3

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# LAYERS ENVIRONMENT

## LAYERS ENVIRONMENT OVERVIEW

The **layers** program is the most frequently used DMD application program. Most of the other application programs (see Chapter 4) run only in the **layers** environment. In the **layers** environment you can easily create up to six totally independent different-sized, active "virtual terminals" on the DMD screen, each with its own UNIX System shell. Each layer is logically a complete terminal with all the same capabilities.

The **layersys** program manages the communication between DMD layers and UNIX System processes. **Layersys** is responsible for assigning mouse operation and keyboard character generation to the proper layer, keeping the contents and visibility of each layer correct, and managing UNIX System communications for each layer. You will not be aware of **layersys**, other than knowing it is a part of **layers**. Figure 3-1 shows how **layers** and the UNIX System communicate.

All layers are active and can communicate with the UNIX System host simultaneously regardless of their visibility although only one layer is current. The current layer is the one attached to the keyboard and mouse.
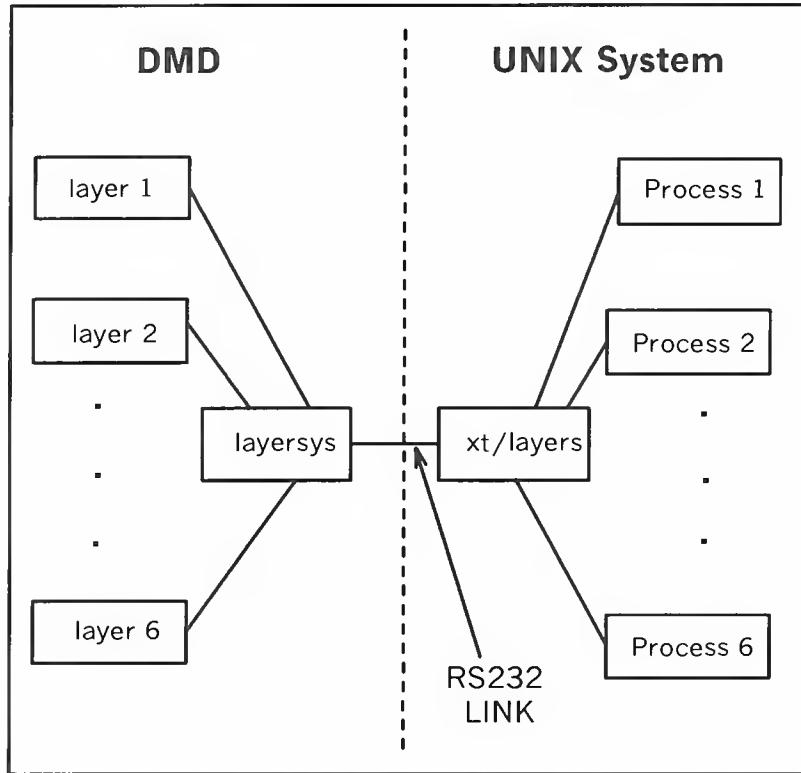
**Figure 3-1.  Layers Environment Communication**

Having all layers active, regardless of their visibility, is extremely
convenient in practice, since it means that you can run independent
processes and keep an eye on their progress without having to poll them
periodically.  You can simply stop typing (even in the middle of a word) in
the current layer, create or move to another layer, do whatever is needed,
then return to the original layer and continue.

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# LAYERS CREATION AND MANIPULATION

## Download the Layers Program

After you login and get the UNIX System prompt, type:

**layers** <RETURN>

and the **layers** program will begin downloading. When downloading is complete, the screen will be textured green. Downloading completion time depends on the terminal firmware version and the line speed. The **layers** arrow cursor will appear when the DMD is ready to accept mouse commands.

### Using the Mouse

*IMPORTANT* - Remember that the mouse buttons are not like those of a keyboard. Depressing and releasing a mouse button are two distinct events, and the **layers** program makes use of this distinction.

For controlling the mouse, "depress" is used to describe the press and hold action and "release" means to let go of the mouse button. "Clicking" a button means "depressing" and "releasing" the button in quick succession. The mouse buttons are referred to as button 1, button 2, and button 3 (left to right, respectively) for a right-hand mouse.

> **Note:** Avoid moving the mouse while "releasing" button 2 or button 3 at the same time; an unwanted selection could be made. If button 2 or button 3 is depressed accidentally, remember to hold it down long enough to move the arrow cursor outside the menu!

With **layers** downloaded, roll the mouse around. Notice that the arrow cursor on the screen follows the movement of the mouse. This arrow cursor is used to point to the menu of **layers** commands.

## Create a Layer

To create a layer:

1.  Depress button 3 (remember, hold it depressed) and the menu of **layers** commands will appear.

2.  Keeping the arrow cursor in the menu, move the mouse around a bit. Notice as you move the mouse, the different menu commands pointed to by the arrow change to inverse video.

3.  Move the arrow (by moving the mouse) to **New**. Release button 3, and the command **New** in inverse video is selected. The arrow changes to a sweep cursor (small square with arrow) which will move as you move the mouse. The sweep cursor is used to draw a layer on the screen.

4.  Move the sweep cursor to near the upper left-hand portion of the screen. Depress (and hold) button 3. Depressing button 3 defines one corner of the layer being created.

5.  Move the mouse around (button 3 must still be depressed). Notice that as you move the mouse, a rectangle is being swept across the screen. This rectangle defines the size of the layer you are creating.

6.  Move the mouse to "sweep" a rectangle of approximately 6 inches wide by 5 inches high; then release button 3. The **layers** program will define this as a layer, establish a communication link to the UNIX System, and connect the keyboard to this layer.

    **Note:** If the UNIX System prompt does not appear within a few seconds, press the RETURN key.

7.  When the prompt appears in the layer, type in a UNIX System command, such as **ls -l** or **pwd**. The output will be displayed in the layer. If the layer is not wide enough for the output line, the line will automatically "wrap-around" to the next line.

*IMPORTANT:* Read the following before creating more layers.

The first layer created is the layer of record for UNIX System commands such as **who**, **write**, and **login**.

Up to six layers can be created; however, creating the maximum is dependent on the amount of DMD memory available. The maximum number of layers that can be created is determined by the size of the layers and the program running in each. Layer parts that are obscured are stored in "off-screen" memory, and thus use some of the DMD display memory. Therefore, the more off-screen memory required for obscured parts of existing layers, the less memory there is available for creating new layers. If you always create large layers, you may find that you will not be able to create the maximum of six. If careful about the size of the layers you create, tailoring them to the actual size you need, you will be able to take advantage of all six layers.

The maximum and minimum size for a layer is handled automatically. The **layers** program will not create a layer smaller than the minimum size (32 by 32 pixels — approximately 1/3-inch square) or larger than available memory permits. Request to create a layer smaller than the minimum size will be ignored. Attempts to create a layer larger than available memory permits will default to the minimum layer size.

Follow the preceding instructions to create layers of different sizes (remember, six maximum). They can overlap or even completely cover another layer. A layer can be reshaped to another size. Each layer will function as an independent terminal.

The rest of this chapter explains the other menu commands. Experiment with each command to become familiar with how each works.

You can download application programs into a layer, edit a file in a layer, and execute UNIX System commands in another layer. Application programs that can be downloaded into layers are explained in Chapter 4.

## Cursor Symbols

While in the **layers** environment, different menu command selections will cause the mouse cursor symbol to change. Each cursor symbol has a useful meaning, as shown in Figure 3-2.

| SYMBOL | NAME | FUNCTION |
|--------|------|----------|
| ↖ | Arrow | Default cursor. Points to menu commands. |
| ⊕ | Target Sight | Perform the selected command at a desired layer. |
| ◱ | Sweep Cursor | Sweeps out a new (or reshaped) layer. |
| ⤬ | Multi-directional Arrow | Moves a layer to new position. |
| ☠ | Skull and Crossbones | Exits the **layers** program and returns the DMD to a resident terminal. |

**Figure 3-2.  Layers Cursor Symbols**

| COMMAND | ACTION |
|---------|--------|
| **New** | Creates a layer |
| **Reshape** | Changes a layer's shape and position |
| **Move** | Moves a layer |
| **Top** | Moves a partially obscured layer to the top (overlays other layers) |
| **Bottom** | Moves a layer to the bottom (may be obscured by other layers) |
| **Current** | Attaches the keyboard and mouse to a layer |
| **Delete** | Removes a layer |
| **Exit** | Exits the **layers** environment |

**Figure 3-3. Layers Menu Commands**

*Note:* To cancel any command selection, click button 1 or 2.

## Layers Menu Commands

The **layers** menu commands are shown in Figure 3-3. The menu is displayed on the screen by depressing button 3. A command is selected by depressing button 3 and moving the mouse arrow cursor to the desired command causing it to become inverse video and releasing the button.

### New

This menu command creates a new layer. The **layers** program presently supports up to six layers maximum. A layer can partially or completely cover another layer. It is recommended that you do not create a layer that completely covers another layer. Completely obscured layers are acceptable; however, users frequently forget about them — the DMD does not.

To create a new layer, refer to Steps 1-7 under "Create a Layer."

*Note:* If XOR'ed menus (faint with the background "showing through") appear, the DMD memory is nearly full. Delete a process and/or layer.

### Reshape

The **Reshape** command changes the size, shape, and position of a layer.

To use **Reshape**, first select it with button 3 and the cursor will change to a target sight. Move the target sight inside the layer you want to reshape; then click button 3. The cursor will change to a sweep cursor. Position the sweep cursor to where you want one corner of the layer. Depress button 3 and move the sweep cursor to reshape the layer and define its new size. Release button 3 and the layer is reshaped.

The size that a layer can be reshaped to depends on the number of layers on the screen and the amount of off-screen memory being used. If there is not sufficient memory to reshape the layer as requested, it will reshape to the smallest size layer.

*Note:* Reshaping a layer can have adverse effects on certain programs running in that layer.

### Move

The **Move** command moves the position of a layer without changing its size or contents. The **Move** command puts the selected layer on top of all other layers.

To use **Move**, first select it with button 3 and the cursor will change to a target sight. Move the target sight inside the layer you want to move and depress (and hold) button 3. The cursor will change to multi-directional arrows. An outline of the layer will now follow the movement of the mouse. When the outline is moved to the desired position, release button 3. The layer is then moved with the contents of the layer intact.

If off-screen memory is insufficient, the move will fail and the layer is left unchanged in its original position.

### Top

The **Top** command moves a layer to the foreground (top of other layers).

To use **Top**, first select it with button 3 and the cursor will change to a target sight. Move the target sight inside the desired layer; then click button 3. The selected layer will move to the top, obscuring other layers that overlap it. The layer selected with the **Top** command does not automatically become the current layer; it has only been moved to the top.

### Bottom

The **Bottom** command moves a layer to be partially or completely covered by overlapping layers.

To use **Bottom**, first select it with button 3 and the cursor will change to a target sight. Move the target sight inside the desired layer, and click button 3. The selected layer will now move to the bottom of the layer stack, partially or completely covered by the overlapping layers.

## Current

The **Current** command allows you to select the layer which will receive input from the keyboard and/or mouse. The current layer remains connected to the keyboard and mouse, even if it is partially or totally obscured by another layer. Interpretation of received inputs depends on the program which is running in the layer.

To use **Current**, first select it with button 3 and the cursor will change to a target sight. Move the target sight inside the desired layer; then click button 3. Commands can now be typed to the selected layer.

*Note 1:* Only one layer at a time can be assigned as current; however, all layers are active.

*Note 2:* The current layer is denoted by a thick border (4 pixels). Non-current layers are denoted by a thin border (1 pixel).

*Note 3:* A completely covered layer must first be "uncovered" by using the **Bottom** command on the covering layer. Then the uncovered layer can be made current.

*Note 4:* Making a layer current with the **Current** command does not move it to the top.

*Note 5:* The command line cursor in the current layer is a solid rectangle. In noncurrent layers the command line cursor is an outlined rectangle.

### A Shortcut

To quickly make a layer current and move it to the top: move the arrow inside the desired layer, click button 1, and the selected layer is made current and moved to the top.

This method brings a layer to the top and makes it current, if it is partially covered or not. The shortcut allows you to move about different layers with more speed and ease.

### Delete

The **Delete** command removes a layer and "kills" all of its associated processes. If the layer to be deleted is current, you must first make another layer current.

> *Note:* The current layer cannot be deleted. Certain programs, such as **dmdp**, may not respond to a **Delete** command during "critical" printing operations.

To use **Delete**, first select it with button 3 and the cursor will change to a target sight. Move the target sight inside the (noncurrent) layer to be deleted, and click button 3. The layer and its associated UNIX System processes are deleted.

### Exit

**Exit** "kills" all layers and returns the DMD to the resident terminal environment.

Select **Exit** with button 3 and the cursor will become a skull and crossbones, indicating that something fatal is about to happen. Click button 3 and the DMD returns to resident terminal operation.

> *Note:* Clicking button 1 or 2 cancels an **Exit** selection (also cancels the other command menu selections).

# LAYERS AUTOMATIC LOADING FEATURE

The **layers** environment incorporates an "automatic downloading" feature (**-f** option) to specify a user-defined layers setup. This feature allows automatic definition of several layers and automatic execution of programs in those layers. This feature provides a "shortcut" to the usual procedure of downloading **layers**, creating layers, then downloading programs in the layers.

To use the "automatic downloading" feature, type:

**layers -f** *filename* <RETURN>

where *filename* is the name of the file that contains the specifications for the layer(s) and the program(s). The layers setup, shown in Figure 3-4, was downloaded automatically by typing

**layers -f** *config* <RETURN>

in the resident terminal mode. Where *config* is the file containing:

```
520 8 792 300 demo clock ; exec sh
8 600 700 1016 vi config ; exec sh
8 8 500 400 echo " This layer is current!" ; exec sh
```

Each line in the file *config* represents a layer as shown in Figure 3-4. The four sets of numbers on each line represent the coordinates *origin.x*, *origin.y*, *corner.x*, and *corner.y* followed by the command or program to be executed in the layer. *Origin.x* and *origin.y* represent the upper left-hand coordinates, and *corner.x* and *corner.y* represent the lower right-hand coordinates. The separators are spaces or tabs. The last line defines the current layer after downloading. The screen is accessible from {8,8} to {792,1016}.

Also, refer to the **layers(1)** manual page in the *5620 Dot-Mapped Display Reference Manual* and the *5620 Dot-Mapped Display Application Development Guide* for more details.

$ This layer is current!

$

15:00:35

```
    520 8 792 300 demo clock ; exec sh
    8 600 700 1016 vi config ; exec sh
    8 8 500 400 echo "This layer is current!" ; exec sh
~
~
~
~
~
~
~
~
"config" three lines, 122 characters
```
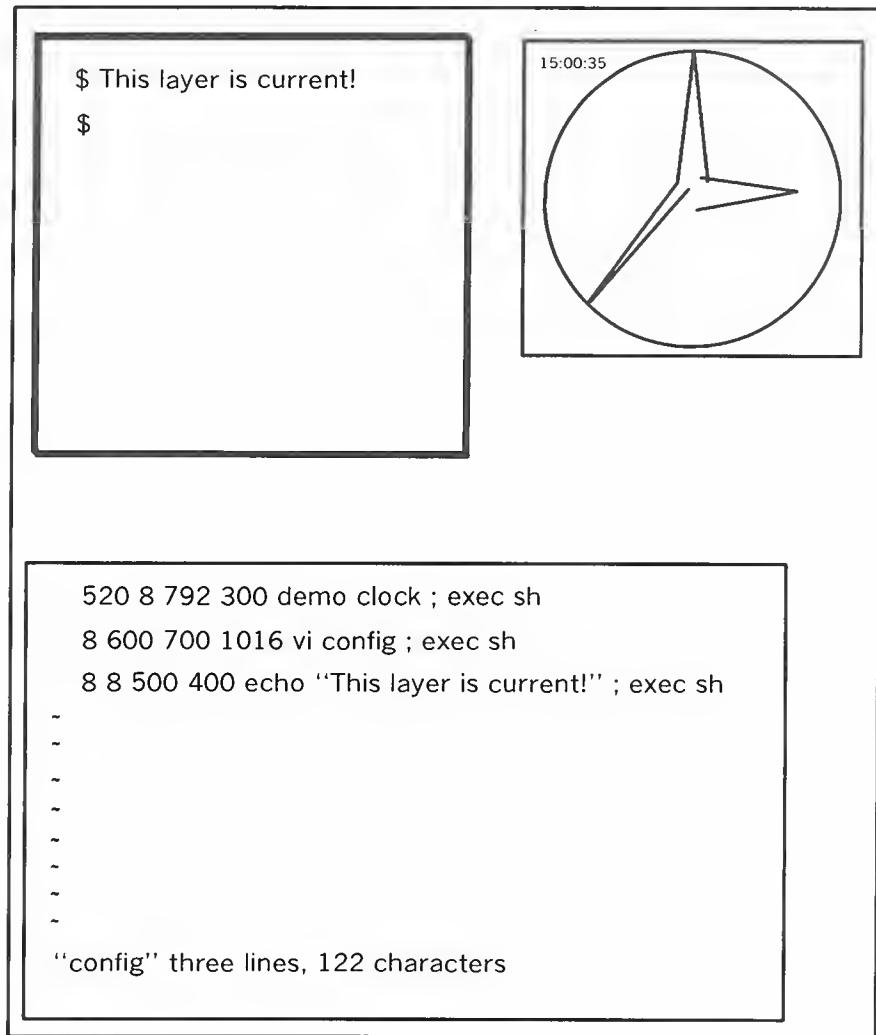
**Figure 3-4. Example of Layers Downloaded Automatically**

# Chapter 4

# APPLICATION PROGRAMS

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# Chapter 4

## APPLICATION PROGRAMS

## OVERVIEW

In this chapter, the detail and attention given to each of the application programs vary. Some application programs only require short functional descriptions and reference to its particular manual page located in the *5620 Dot-Mapped Display Reference Manual*. Other programs require greater explanation and are covered in detail. In all cases, the manual page for each program should be reviewed when using a program for the first time.

All of the application programs listed in this chapter are downloaded and run in the **layers** environment, unless otherwise noted. See Chapter 3 for details on using the **layers** program. Application programs are downloaded in a layer by typing in the desired program name and pressing the RETURN key.

After using some of the programs, experiment on your own. Do not allow yourself to be limited to our suggestions. If you get into trouble, refer to the program's manual page or Chapter 7, "GETTING OUT OF TROUBLE."

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# APPLICATION PROGRAMS

## User Level Programs

The Core Utilities Package application programs are listed below. It is suggested that you first use the programs denoted by an asterisk(*). This chapter covers the programs in the order listed. Although listed here, the DMD text editor and printer programs are detailed in other chapters.

- **32ld** — downloader for DMD programs

- **demo*** — demonstration programs available on the DMD

- **hp2621** — Hewlett-Packard 2621 terminal emulator

- **ismpx** — queries the mode of the DMD (if **layers** or not)

- **jterm** — resets a DMD layer

- **jwin** — prints window size of the current layer

- **jx** — DMD standard input/output simulator

- **lens*** — interactive magnified viewing window

- **relogin** — rename login entry to show current layer

- **sysmon*** — monitor UNIX System activity

- **tek4014** — TEKTRONIX† 4014 terminal emulator

- **t5620** — provides graphics filters for **tplot(1G)**

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†    Registered trademark of Tektronix, Incorporated

- **twid\*** — an interactive drawing program

- **xtd** — extract and print xt driver link structure

- **xts** — extract and print xt driver statistics

- **xtt** — extract and print xt driver packet traces.

- **jim\*** — screen/mouse oriented text editor (see Chapter 5 for details)

- **jim.recover** — interactively recover lost editing after abnormal failure (see Chapter 5 for details)

- **dmdp** — DMD printer program (see Chapter 6 for details)

- **dmdcat** — DMD printer program (see Chapter 6 for details)

- **screendump** — (3B2 Computer only) printer support program for DMD (see Chapter 6 for details)

- **bcan** — (3B2 Computer only) filter to process **screendump** command (see Chapter 6 for details)

- **lpg** — (3B2 Computer only) interface for bitmap printing on the **lp** spooler system (see Chapter 6 for details).

## 32ld - Program Downloader

Software for the DMD runs in two parts: one part in the DMD itself, and the other part runs in the host UNIX System computer. To get a program into the DMD so the software can set up a link to the UNIX System and establish a communication protocol, the **32ld** program downloader is required. It downloads the executable object programs into the DMD.

The **32ld** program downloader is not normally called directly by a user, except for locally developed software. (See the *5620 Dot-Mapped Display Application Development Guide*.) Most programs running in the **layers** environment will execute **32ld** automatically when called. Programs running in the **stand-alone** environment also execute **32ld** automatically.

In the resident terminal and **stand-alone** environments, when **32ld** is downloading a program, a series of thin broken lines will begin appearing across the top of the screen. These lines represent the data bits being downloaded into memory. You will see this for every **stand-alone** program downloading into the DMD. The mouse and the keyboard are disabled while **32ld** is downloading a program. When downloading is completed, the program begins execution. At this time, operation is determined by the downloaded program.

In the **layers** environment, the downloading process is shown as inverse video bands advancing from the bottom of the layer to the top. The cursor changes to a "coffee cup" within the downloading layer, if current, informing you that a program is downloading. The keyboard and mouse are disabled for that layer while a program is downloading. When downloading is complete, operations (in that layer) depend on the downloaded program.

The **32ld** program downloader is invoked automatically when downloading application package programs. Therefore, **32ld** does not need to be typed. However, it is possible to make explicit **32ld** calls. An explicit **32ld** call, with options, is generally made to produce statistical information. See the **32ld(1)** manual page in the *5620 Dot-Mapped Display Reference Manual* for detailed information.

## DEMO - Demonstration Programs

The **demo** program runs a number of individually executable demonstrations. The **demo**s allow the new user and onlooker to become familiar with many DMD capabilities.

The **demo**s are also designed for fun and letting new users play with the mouse and **layers** capabilities. Note that this is not "frivolous playing." New users need to acquire the dexterity, coordination, and the familiarity necessary to effectively use the DMD. The **demo** programs allow this without the problems and frustrations associated with "learning on the fly." The **demo**s can execute in the **layers** and/or **stand-alone** environments.

To see a list of the demonstrations available in your current environment (**stand-alone** or **layers**), type:

<p align="center">demo&lt;RETURN&gt;</p>

To execute an individual **demo**, type:

<p align="center">demo <em>demo_name</em>&lt;RETURN&gt;</p>

Only one **demo** can be run in a layer (or **stand-alone**) at a time. Typing a **q** will usually exit a **demo** program, except where noted otherwise.

Individual programs are listed and discussed in the *5620 Dot-Mapped Display Reference Manual* **demo(1)** manual page.

## HP2621 - Hewlett-Packard Terminal Emulator

This application program causes a layer to act as if it were a Hewlett-Packard 2621A terminal.  The **hp2621** program can handle terminal specific commands such as cursor positioning, screen clearing, and character insertions and deletions.  An **hp2621** layer will appear to the host as if it were that specific terminal.

This program can be used by those with existing programs which are dependent on the Hewlett-Packard 2621 terminals.  Programs that normally run on the host and derive their input/output from that type terminal would then run correctly in a DMD layer.  The emulator will pass most keyboard input to the host program.

Mouse buttons 1 and 3 operate normally.  Button 2 is used to display a menu of scrolling commands particular to a Hewlett-Packard terminal. Button 2 also has an option to create a new layer without the need to download **hp2621** a second time.

See the **hp2621(1)** manual page in the *5620 Dot-Mapped Display Reference Manual* for more details.

## ISMPX - Queries Terminal Mode

This command is normally used in shell scripts to determine if the terminal is in the **layers** environment or not.  The DMD will respond **yes** if **ismpx** is typed in a layer and **no** if typed in the resident terminal state.

See the **ismpx(1)** manual page in the *5620 Dot-Mapped Display Reference Manual* for details.

## JTERM - Layer Reset

The **jterm** command is used to reset the terminal after invoking programs that change the terminal attributes. It is used only under the **layers** environment. Core Utilities Package programs call **jterm** automatically as needed.

See the **jterm** manual page in the *5620 Dot-Mapped Display Reference Manual* for details.

## JX - Standard I/O Interpreter

The UNIX System call interpreter **jx** allows application programs running on the DMD terminal to have access to the host UNIX System I/O. **Jx** provides system calls which deal primarily with I/O. This allows a DMD program, for example, to open, read, and write UNIX System files.

See the **jx(1)** manual page in the *5620 Dot-Mapped Display Reference Manual* and the *5620 Dot-Mapped Display Application Development Guide* for details.

## JWIN - Prints Layer Size

When typed in a layer, **jwin** displays the size of the current layer.

See the **jwin(1)** manual page in the *5620 Dot-Mapped Display Reference Manual* for details.

## LENS - Screen Magnifier Program

The **lens** program creates a "pseudo magnifying viewer" that will magnify portions of the screen. Moving the viewer about the screen will magnify the portion of the screen within the viewer. The viewer magnifying power is changeable and will move across layers.

To download the **lens** program in a current layer, type:

**lens**<RETURN>

When downloading is completed, the **lens** layer will display a representation of a magnifying viewer. The arrow will change to a mini-magnifying glass.

Button 1 is used as a toggle to turn **lens** on and off. Button 2 displays the **lens** menu (when the **lens** layer is current). Button 3 is the same as it is for **layers**. To display the **lens** menu, move the arrow cursor inside the current **lens** layer; then depress button 2. To start the **lens**, select the **go** option by moving the arrow to **go**; then release button 2. A viewer will be created that will move across the display (and across layers!) corresponding to the movement of the mouse.

The viewer consists of two parts: the viewer and the magnified image. The viewer portion defines the image that the magnified image will display. The magnified image size can be changed from 1x through 13x by using the **bigger** or **smaller** menu options. Obtaining the maximum magnification size is limited by the amount of available memory. The **lens** menu also provides options for a **new viewer** (to change viewer shape) and a **pause** control.

See the **lens(1)** manual page in the *5620 Dot-Mapped Display Reference Manual* for detailed information.

## RELOGIN - Renames Login Entry

The **relogin** command changes the **utmp** entry containing the terminal line to the name of the current DMD layer. **Relogin** is invoked automatically by **layers**. Users can invoke **relogin** when a different DMD layer has been chosen for receiving **write(1)** messages.

See the **relogin(1)** manual page in the *5620 Dot-Mapped Display Reference Manual* for detailed information.

## SYSMON - UNIX System Activity Monitor

The **sysmon** program allows you to monitor UNIX System activity from a layer devoted entirely to system observation. This program is very useful for system administrators, programmers and other users that need to determine how the system allocates its resources (CPU time, kernel time, idle time and wait time); see Figure 4-1. In addition **sysmon** also provides these courtesy features:

- A digital clock displaying the current time

- Notification of new mail with identification of the sender and an optional subject field.

| CPU time | kernel time | wait time | idle time |
|----------|-------------|-----------|-----------|
| digital clock | | | |
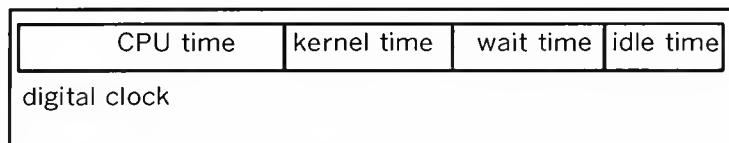
**Figure 4-1. Typical Sysmon Layer**

See the **sysmon(1)** manual page in the *5620 Dot-Mapped Display Reference Manual* for more information.


## TEK4014 - Graphics Terminal Emulator

The DMD will emulate a TEKTRONIX 4014 computer display terminal when downloaded with the **tek4014** program. The **tek4014** program is downloaded and operated in the **layers** environment.


To use the **tek4014** program, your UNIX System should have the **graphics** package. The **graphics** package is the name given to a collection of numerical and graphical commands available as part of the UNIX System. **Graphics** includes commands to construct and edit numerical data plots and hierarchy charts. Drawings in **graphics** are built from objects consisting of lines, arcs, and text. By using the **graphics** editor **ged**, objects can be created, deleted, moved, copied, rotated, scaled, and modified. For detailed information on the **graphics** package, refer to the *UNIX System Graphics Guide*, available from AT&T.


To access the **graphics** commands once the **tek4014** layer is downloaded, type:


<p align="center"><b>graphics</b>&lt;RETURN&gt;</p>


The UNIX System shell variable **PATH** will be altered to include the **graphics** commands, and the shell prompt will be changed to a "^". Any command accessible before typing **graphics** will still be accessible; **graphics** only adds commands, it does not take any away. Once in **graphics**, you can find out what commands are available by typing **whatis**. Typing **whatis** on a line by itself (command line) will generate a list of all the commands in **graphics** along with instructions on how to find out more about them.


See the **tek4014(1)** manual page in the *5620 Dot-Mapped Display Reference Manual* for details, especially on using the mouse to select options.

## T5620 - Graphics Filters for TPLOT(1G)

The **t5620** package provides graphics filters for the UNIX System **tplot(1G)** command when using the DMD.

See the **tplot(1G)** manual page in the *UNIX System V User Reference Manual* for details.

## TWID - Interactive Drawing Program

With the **twid** program you can use the mouse to draw textured pictures inside a layer. The **twid** textures appear as if they were actually done with a paint brush. Persons with an artistic flair can use **twid** to create masterpieces with ease.

To download the **twid** program in a current layer, type:

**twid**<RETURN>

Art work drawn in a **twid** layer, collectively referred to as bitmaps, can be saved in a file and retrieved later.

The next several pages describe the features of **twid** in detail.

### Using the Mouse in twid

Mouse buttons 1 and 2 are used for drawing in one of four possible modes. These four modes are discussed later. The selection of button 1 or 2 is dependent on the mode you wish to use. In the default mode, button 1 draws the drawing (bitmap) and button 2 erases. Button 3 displays the "super menu" (a menu with menus as selections) that allows you to tailor **twid**'s creative tools to your liking.

### The "Super Menu"

The "super menu" is composed of seven selections, six of the selections have menus. To make a menu selection, first depress button 3, (causing the "super menu" to be displayed on the screen), make a selection, and release button 3. A small menu cursor will be displayed. This is to prompt you to depress button 3 again and access the chosen menu. The six functional menus and the options each one provides follow.

### The style menu

The selections in this menu allow you to chose the appropriate tool for use in your videographic rendering. Its selections are detailed below:

**ink**   Selecting this menu option will cause buttons 1 and 2 to emulate a fountain ink pen and draw continuously when depressed.

**point**  This option causes buttons 1 and 2 to draw point by point, that is, each time the button is clicked it overlays, with the current texture, an area equivalent to the size of its brush in the exact area its brush is occupying. The brush then becomes inactive and button 1 or 2 must be clicked again to repeat this process.

**line**   This menu option allows you to draw a straight line, about two pixels wide, from one point to another. Once the **line** menu option has been selected, click either button 1 or 2, depending on the mode you wish the line drawn in, at the point where the line is to begin. As soon as this beginning point has been established a straight line will appear attached to both the beginning point and the cursor. The end of the line will stick to the cursor wherever it is moved within (and outside) the layer. To draw the line, merely place it where you wish and click either button 1 or 2. The line will be drawn and a new line will appear attached to the ending point of the old line and the cursor. This line will stick to the cursor just like the first one. This process can be stopped by depressing button 3 and started again by depressing button 1 or 2.

**fine point**    This option permits you to draw with a fine point brush that is particularly adept at drawing unbroken curved lines with the free flowing quality associated with the **ink** option detailed above.

**disc**    This option allows you to draw discs of any diameter. When this option is selected, you can depress button 1 or 2, depending on the mode needed, and sweep out a disc of any size. Releasing the button will draw the disc within the layer.

**The texture menu**

The selections in this menu permit you to use one of the textures listed below as "paint" in which to dip your hypothetical brush.

**&lt;new&gt;**    This option allows you to create and name textures. To create a new texture you begin by blending one or more of the existing textures offered into a preferred pattern, and then select the **&lt;new&gt;** option from the **texture** functional menu. The cursor will become a small square, 16 x16 pixels in dimension. This square must be positioned over the area containing the preferred texture, and button 1 or 2 depressed. This causes the typing cursor (a downward arrow) to appear. It is prompting you to type in a name terminated by a RETURN for the newly defined texture. The new texture name is added to the **texture** functional menu and becomes the current texture. *NOTE:* The **&lt;new&gt;** textures cannot be saved between sessions.

**black**    This option makes your "paint" black.

**grey**    This selection makes your "paint" grey.

**checks**    This option allows you to "paint" with a checkerboard texture.

**stipples**    This option makes your "paint" light grey.

**The brush menu**

The selections in this menu allow you to chose from a variety of different brush sizes or you can create your own.

&lt;**new**&gt;        This option permits you to create a brush.  To do this you must first draw out the form of a brush, it can be any shape, size, or texture, using button 1 and sometimes 2, depending on the button options chosen (see **The buttons menu** next).  Next, select the **brush** selection from the "super menu" followed by the &lt;**new**&gt; selection from the **brush** menu.  This will cause a sweep cursor to appear.  Button 3 should be depressed and a rectangle swept out enclosing the area of the brush.  When button 3 is released, a typing cursor will appear to prompt you to type in a name for the new brush terminated with a RETURN.  When this is done, the new brush becomes the current brush.

**point**        This option gives you a small brush only 1 pixel in size.

**smallbox**        This option gives you a square brush 4 x 4 pixels in area.

**medbox**        This option provides a square brush 8 x 8 pixels in area.

**bigbox**        This option provides a square brush 16 x 16 pixels in area.

**The buttons menu**

The selections in this menu determine the modes that buttons 1 and 2 possess when used for drawing.

**or-clear**     Button 1 draws in **or** mode and button 2 draws in **clear**.

**or-xor**       Button 1 draws in **or** mode and button 2 draws in **xor**.

**store-clear**  Button 1 draws in **store** mode and button 2 draws in **clear**.

**store-xor**    Button 1 draws in **" store"** mode and button 2 draws in **xor**.

**The copy menu**

The **copy** menu allows you to copy and rotate portions of a **twid** drawing (bitmap).

**copy**         This option leads to a submenu that allows you to copy and move portions of the **twid** picture (bitmap).  After choosing one of the options from the **copy** submenu, a sweep cursor appears.  This is prompting you to enclose a portion of the picture (bitmap) by sweeping out a rectangle using button 3.  When this is done, button 3 should be released and a blinking copy of the bitmap will appear. This copy can be moved to any place within the layer and drawn by depressing button 3.

The **copy** submenu

**store**        Copy bitmap and redraw in **store** mode.

**or**           Copy bitmap and redraw in **or** mode.

**and-not**      Copy bitmap and redraw in **and-not** mode.

**xor**          Copy bitmap and redraw in **xor** mode.

**move**  The difference between this option and the ones above is that the bitmap is actually moved from one location within the **twid** layer to another. The bitmap is redrawn in **store** mode only.

**rotate**  The **rotate** option lets you rotate a bitmap, 90 degrees at a time, in a clockwise direction. To rotate a bitmap, you first select the **copy** selection from the "super menu" and then the **rotate** selection from the **copy** menu. This will cause a sweep cursor to appear; button 3 must be depressed and a rectangle swept out enclosing the area to be rotated. When button 3 is released, the area enclosed (the bitmap) will be rotated one quarter turn (90 degrees), and a typing cursor will appear along with the query *again?(y/n)*. If you answer *y* the bitmap is rotated again. If you answer *n* or anything else, **twid** will return the current brush and texture.

### The unix menu

This menu has options that allow you to read bitmaps stored in files, to write bitmaps out to files, and to exit **twid** and return to **layers**.

**read**  The **read** option allows you to read a bitmap from a file stored previously by **twid**. After selecting the **read** option, a typing cursor will appear, prompting you to type in the name of the file in which the bitmap is stored. After the file name is typed in, another query will appear [*mode (=,˜,ˆ, !)?*] requesting the mode that you wish the bitmap to be drawn in. You answer by typing one of the following:

=  this makes the mode the same as the original mode the bitmap was written in. This is also the mode **twid** defaults to if it receives anything other than the four choices listed above.

| | |
|---|---|
| ~ | this causes a logical AND to be performed on the bitmap. |
| ^ | an exclusive OR is performed on the bitmap. |
| ! | an inclusive OR is performed on the bitmap. |

Assuming that **twid** receives valid input, the query *absolute positioning (y/n)?* will be printed in the lower left-hand corner of the layer. Answer by typing a *y* or *n*, followed by a RETURN. If you respond with a *y,* the bitmap (when it is drawn) will be positioned relative to its position within the layer it was written from. If you answer *n,* the instruction [*point to origin (upper left corner of bitmap) and hit a button*] will appear along with a typing cursor. Pointed to the origin point and click any button, and the bitmap will be drawn at this position.

write      This option lets you define and save bitmaps in a file. When this option is chosen, the instruction *File name?* appears. In response, you must type in a file name followed by a RETURN. This will cause the cursor to change to a sweep cursor and the request "*sweep out which rectangle*" to be printed on the bottom of the layer. You should move the sweep cursor and then depress button 3 to enclose the desired area (bitmap). When the button is released, **twid** goes off to perform the write and becomes totally inactive until the write is completed. Upon successful completion of the write, **twid** returns to the state present before the selection of this menu option and prints the phrase "*write done*" in the lower left corner of the layer. Writing a bitmap out to a file does not remove the image from the screen.

exit      The **exit** option allows you to exit **twid**. When this option is chosen, a skull and crossbones cursor appears within the **twid** layer. If button 3 is clicked after the skull and

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crossbones cursor has appeared, the program will be exited and you will be returned to a shell layer. Clicking button 1 or 2 will cause **twid** to return to its state before the selection of **exit**.

### The clear all selection

The last entry in the "super menu" is the **clear all** command. This selection does not have an associated menu. When **clear all** is selected, the cursor changes to a sweep cursor. The sweep cursur is used to erase drawings in the **twid** layer. Depress button 3 and sweep a box around entire bitmap or its parts. When button 3 is released, all bitmap parts within the swept box will be erased.

## XT - Extract and Print Driver Information

All three of the following commands are used to gather debugging information on the DMD xt driver. These programs are intended mainly for system administrators and programmers.

- **xtd** - extracts and prints xt driver link structure.

- **xts** - extracts and prints xt driver statistics.

- **xtt** - extracts and prints xt driver packet traces.

See the *5620 Dot-Mapped Display Reference Manual* manual pages for details.

# Chapter 5

# THE JIM EDITOR

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**Chapter 5**

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# THE JIM EDITOR

## INTRODUCTION

The **jim** visual editor is designed to improve the terminal-human interface by using the mouse. A user can copy, move or delete text entirely under control of the mouse. The **jim** editor allows several files to be edited at the same time, and it allows data to be transferred easily between files. The **jim** editor runs in the **layers** environment.

You will find **jim** relatively easy, fast, and fun to use. It will, however, take some time and practice to become acclimated to using the mouse as an editing device.

The instructions in this chapter for using **jim** are presented in a tutorial sequence. For faster learning, first-time users should follow along on their DMD in the sequence presented. After gaining familiarity with **jim** operations, use the **jim(1)** manual page in the *5620 Dot-Mapped Display Reference Manual* for quick reference.

## The Jim Layer

The **jim** layer (see Figure 5-1) is the **jim** application program downloaded into a DMD layer. With downloading complete and a few mouse manipulations, the **jim** layer will consist of:

- A one-line command and diagnostic frame at the bottom of the **jim** layer

- One or more multiline file frames of user-determined sizes, each with a scroll bar, a positional "tick", and a movable "text cursor." Each frame can contain a different file for editing.

Figure 5-1 shows only three frames (files); however, many frames can be made.

> **Note:** The maximum number of frames that can be made is dependent on file sizes plus the amount of DMD memory available.

The **jim** editor can be downloaded into more than one layer. However, first time users should download **jim** into only one layer to avoid confusion. The frames in **jim** are made and reshaped similarly to layers.

TEXT
CURSOR

TICK

SCROLL
BAR

JIM
LAYER

COMMAND
LINE
FRAME

CURRENT
TEXT
FRAME

TEXT
FRAME 2

TEXT
FRAME 3

$ ls
*file1*
*file2*
*file3*
$

$

OTHER
LAYERS
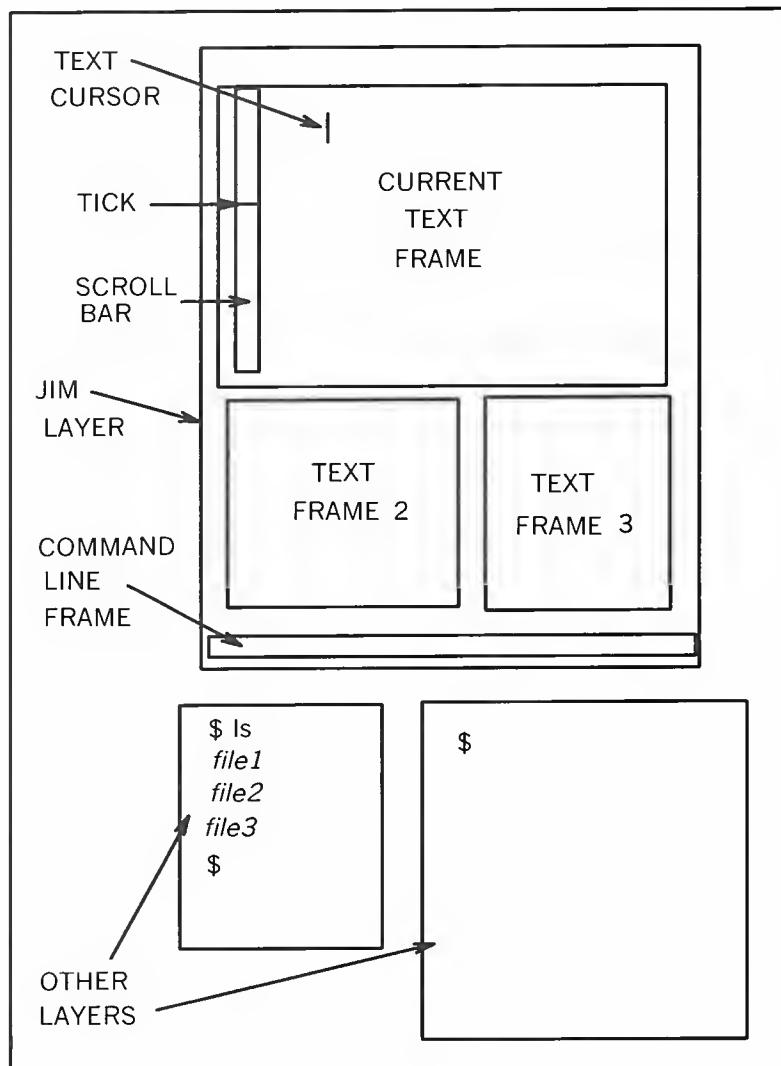
**Figure 5-1. Sample DMD Screen with Three Jim Frames Open**

## JIM OPERATIONS

When using **jim** for the first time, it is suggested that you use "junk" files for practice.

### Using the Mouse in Jim

In general, button 1 is used for text selection, button 2 provides a menu of text manipulation functions, and button 3 provides control for interframe operation.

Avoid moving the mouse and releasing button 2 or button 3 at the same time. If button 2 or button 3 is depressed accidentally, remember to hold it down long enough to move the arrow cursor outside the menu!

***To start using* jim**:

1. Create a layer about two thirds the height of the screen. Other layers can be created beneath this layer (refer to Figure 5-1).

2. Make the large layer current, by moving the arrow cursor into it and clicking button 1.

3. Type: **jim** and press the RETURN key. The **jim** editor program will begin to download into the layer.

4. When downloading is completed, move the arrow cursor inside the **jim** layer and click button 1 to make it current.

5. Depress (and hold) button 3 and the **jim** command menu will appear.

6. Select the **new** command with button 3 and sweep out a work frame covering approximately half of the **jim** layer. Frames in **jim** are made exactly like layers are created. This frame will have an inverse video scroll bar to indicate that it is current work frame.

**Note:** Before another frame can be made, the preceding frame must be used (such as, a character typed in it, a file edited, etc.)

## Loading Files for Editing

A frame is made before a file(s) is loaded into it and edited.  The **e** *filename* command is used to load a file into a frame.

### To load a file into a frame:

1.  Make the **jim** command line active (inverse video) by

    a.  moving the arrow cursor inside the command line and clicking button 1,

    b.  or by pressing the keyboard LINE FEED key.  This will work only if at least one frame is open.

    The command line is now ready to accept commands.

2.  In the command line, type **e** *filename* and press RETURN.  The arrow cursor will change to a dead mouse until *filename* is completely loaded into the current **jim** frame.

3.  Make another frame beneath the first one, then activate the command line and type **e** *different_filename*.

## Selecting Text

In **jim** the text is edited after it has been selected. Selected text is highlighted in inverse video. Button 1, in conjunction with the "text cursor," is used to select areas of text. An area of text can be anything from a single character to the entire displayed contents of the frame.

### *Positioning the "text cursor"*

The "text cursor" is the narrow vertical bar that marks text position in a frame (shown in Figure 5-1). All text selection either precedes or follows the "text cursor." Location of the "text cursor" is changed by moving the mouse arrow cursor and clicking button 1. The "text cursor" will move to the null space nearest the arrow cursor when button 1 is clicked. Button 1 can be clicked to move the "text cursor" any number of times without ill effects.

### *To select words:*

1. In the current work frame, position the arrow cursor near the middle of a word and click button 1.

2. Notice that the "text cursor" appears within the word; if not, reposition the arrow cursor directly over the word and click button 1 again and the "text cursor" should appear within the word.

3. Without letting the mouse roll around, click button 1 a second time, and the word with the "text cursor" within it will be selected in inverse video.

> **Note:** If the mouse is moved before button 1 is clicked the second time, the "text cursor" will change position and the word will not be selected.

Notice that the word is selected up to the next delimiter (space, comma, colon, semicolon, bracket, and so forth). If button 1 is clicked a third time the line or word will become normal video (unselected state).

*Note:* Words can also be selected with the "text cursor" at either end of the word.

**To select a line:**

Position the "text cursor" at the beginning or ending of a line. Without letting the mouse roll around, click button 1 and the entire line will be selected in inverse video.

**To select an arbitrary continuous text string:**

1. Position the "text cursor" at the beginning or ending of the text string to be selected.

2. Depress (and hold) button 1. Then move the mouse around and notice that as the mouse moves, text is being highlighted in relation to mouse cursor movement.

3. When the desired text is highlighted in inverse video, release button 1 and the text should remain in inverse video. At first it may take several attempts to select the desired text. If unsuccessful, try again.

## Deleting Text

Text (including blank lines and spaces) can be deleted by using the mouse, keyboard, or a combination of both.

### *To delete text with the mouse:*

1. In a current work frame, select the text string to be deleted as previously explained under "Selecting Text."

2. Depress button 2. Select **cut** from the menu; then release button 2 and the text in inverse video will be deleted from the frame. (The deleted text is actually stored in the "save buffer," which is discussed later.)

### *To delete text using the keyboard:*

Position the "text cursor" to the right side of the text to be deleted and press the BACK SPACE key once for each character to be deleted.

## Inputting Text

Text can be input into a frame by any of the following methods:

- Input text directly into an existing or empty frame by typing in the desired text. Typed text always follows the "text cursor."

  *Note:* Blank lines can be quickly inserted by moving the "text cursor" to the end of a line and pressing the RETURN key.

- Move and copy text within the frame and/or to another frame, which is covered next.

- Use standard input/output redirection (explained later).

## Moving and Copying Text

Moving and copying text within a frame and/or to another frame within the **jim** layer is mouse dependent.

Use button 2 to select **cut** if the selected text is to be deleted from one location and moved to another. Select **snarf** if the text is to be copied to another location, but not deleted.

### *To move (cut) or copy (snarf) text:*

1.  In the current frame, select the text to be moved or copied.

2.  Depress button 2. Select **cut** or **snarf** from the menu and then release button 2. If **cut** was selected, the inverse video text is removed from the frame. With **cut** or **snarf** the text is actually stored in the "save buffer" which is explained later.

3.  Using button 1, position the "text cursor" to the desired location of text insertion. Ensure that the "text cursor" is to the right of where text is to be inserted. The location can be within the current frame or in another frame! (Moving or copying text to another frame is explained later.)

4.  Depress button 2. Select **paste** and then release button 2 and the text will be inserted immediately preceding the "text cursor."

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### *To move or copy text to another frame:*

1. Select the text with **cut** or **snarf**.

2. Make the receiving frame current.

3. In the current receiving frame, position the "text cursor" to the immediate right of where text is to be inserted.

4. Depress button 2, select **paste** then release button 2. The previously selected text will be inserted immediately following the "text cursor."

When moving or copying text, it is often necessary to search or scroll for the desired text insertion location if it is not displayed in the frame. Searching and scrolling are explained later.

## Changing Text

### *To quickly change text:*

1. Use button 1 to select the text string to be changed, highlighting it in inverse video.

2. Then type the replacing text. The highlighted string will be replaced (an implicit **cut**) as soon as the first character of the replacing text is typed.

The replaced (highlighted) text is stored in the "save buffer." Therefore, it can be retrieved with a button 2 **paste** command. The save buffer is discussed next.

## Save Buffer Considerations

The **jim** editor has a single save buffer. The save buffer stores selected inverse video text after an editing command action. Each new editing command action overwrites what was previously stored in the save buffer. The **cut**, **snarf**, and "quick change" operations store the selected text in the save buffer. The **ESC** key can also store text in the save buffer; its use is explained later in this chapter. The **paste** command is used to insert or retrieve the save buffer contents.

If you want to keep the save buffer contents intact while continuing to perform other edit functions:

- make a new (empty) frame and then **paste** the save buffer contents into it for retrieval when needed,

- or use a combination of the BACK SPACE key, keyboard keys, and "text cursor" to perform editing functions without disturbing the save buffer contents.

## Write Commands

Write commands are used to overwrite files (frames) after changes have been made. Write commands make file changes permanent until more changes and another write command are done. There are two ways to write a file in **jim**: use mouse button 3 **write** or the keyboard **w** command.

*To write a file using button 3:*

1. Depress button 3. Select **write** on the menu and then release button 3. The cursor will change to a target sight.

2. Move the target sight inside the frame to be written.

3. Clicking button 3 will write the file and the message: **wrote** *filename* will appear in the command line (*filename* is the name of the file). Clicking button 1 will abort the **write** command selection.

The keyboard **w** command is used to write a named file or write the current file if no *filename* is specified.

### *To write files with the* w *command:*

1.  Make the desired frame current and then activate the command line.

2.  On the keyboard, type: **w** and press RETURN.  The message **wrote** *filename* appears in the command line.  If **no file name** appears, the file has not yet been named.  Perform the next step.

3.  In the active command line, type: **w** *filename* and press RETURN. The message **wrote** *filename* will appear in the command line.

## Naming Files

The keyboard **f** command is used to name, rename, or determine a frame *filename*.

### *To name or rename a file:*

1.  Make the frame to be named current.

2.  Activate the command line and type: **f** *filename*, press RETURN and **'. filename** will appear in the command line.  The file is now named or renamed.

To make a newly named or renamed file permanent, the file must be written as detailed in the preceding section.

### *To determine the filename of a current frame:*

Activate the command line and type: **f** press RETURN.  The current frame's *filename* will appear in the command line.


## String Searches

The ' / ' command searches forward and the ' **?** ' command searches backward.  Both will search from the current line for the next occurrence of a predetermined text string.


### *To perform string searches:*

1.  In a current work frame, determine a known text string.

2.  Activate the command line.

3.  Type: /*[any existing text string]* then, press RETURN.  The string will be highlighted in inverse video when located.


The frame will be redrawn when necessary.  Of course, a ' **?** ' can be used instead to search backwards.  Both string searches will wrap around in the frame.  The search starts immediately following the "text cursor," in the case of ' / ' (vice versa for a ' **?** ').  If the text string is not found, the message **string not found** will appear on the command line.


The most recent search command is added to the button 2 menu and can be repeated by selecting it.  Typing a ' / ' or ' **?** ' in the command line without a string will also repeat the most recent string search.


Text strings in **jim** obey the same rules as full regular expressions, as in the UNIX System command **egrep(1)**.  As an example, to search for a *, you must type \*.

## Other Jim Commands

### Miscellaneous Commands

These commands can be executed from the command line:

**g** *filename*    Grabs *filename* by prompting to sweep cursor with button 3.

**cd** *dir*    Set the working directory to *dir* as in the shell. There is no CDPATH search, but $HOME is the default *dir*.

### Editor Commands

The active **jim** command line can also execute the following commands:

  **E**    Edits the file unconditionally.

  **q**    Conditional quit.

  **Q**    Unconditional quit.

  =    Displays the text cursor line number location.

These commands function exactly as in the UNIX System **ed(1)** editor.

### *I/O Redirection Commands*

An active **jim** command line can execute the following UNIX System commands:

> Sends the selected text to the standard input of a command.

< Replaces the selected text by the standard output of a command.

¦ Replaces the selected text by the standard output of a command, given the original selected text as standard input.

As an example, typing > **pwd** in the active command line will cause the working directory to be printed.

The most recent I/O redirection command is added to the button 2 menu for easy repetition.

## Frame Positioning and Scrolling

Positioning in a current work frame can be done from the command frame or with the mouse.

### *To position from the active command line:*

Type ## (where ## represents any existing line number) and press RETURN. The text of the line number typed will be highlighted in inverse video. The frame will be redrawn if necessary.

### To use the mouse for positioning:

Notice the small "tick" inside the working frame's inverse video "scroll bar." The tick indicates the relative position of the file displayed inside the frame.

### To change the file's displayed position:

Locate the arrow cursor inside the scroll bar and then click a mouse button, as determined from the following:

- Button 1 moves the line at the top of the frame to the location where button 1 is clicked within the scroll bar. This causes the file to scroll forward until the first line of the file is at the top of the frame.

- Button 2 moves the frame file absolute position (indicated by the "tick") to where button 2 is clicked. If button 2 is clicked in the middle of the scroll bar, the middle portion of the file will be displayed. When clicked at the end, beginning, or any fraction thereof, that portion of the file will appear in the frame. This feature is very useful for scrolling in long files.

- Button 3 moves the line of text where button 3 is clicked within the scroll bar to the top of the frame. This causes the file to scroll backwards.

*Note:* Buttons 1 and 3 can be held down to repeat.

## Special Characters

The only characters which cannot be inserted in the text are the BACK SPACE (CTRL H), CTRL W, and the ESC key.

- BACK SPACE is the usual back space character which erases characters to its left.

- CTRL W erases back to the word boundary preceding the selected text or "text cursor."

- ESC key selects the text typed since the last mouse button was clicked. If an ESC key is pressed twice immediately after typing text, it is identical to a **cut**. After pressing ESC once, the button 2 **paste** command can then be used to "undo" changes.

## Button 3 Menu Features

Mouse button 3 has four commands in its menu: **new**, **reshape**, **close**, and **write**.

The **new** command behaves like **New** in the **layers** environment; it is used to make the frames inside the **jim** layer.

> *Note:* When the sweep cursor appears after selecting **new**, if you click button 3, the new frame will automatically reshape itself to fill the **jim** layer.

> The **reshape** command changes the shape of a frame, as follows:

1. Depress button 3, select **reshape**, then release (the cursor is now a target sight).

2. Move the target sight cursor over the frame to be reshaped.

3. Click button 3, and the "sweep cursor" (square cursor with an arrow) appears as the cursor. Now, you have a choice;

   a. click button 3 again and the selected frame will automatically reshape itself to fill the **jim** layer.

   b. or move the sweep cursor to locate a corner of the frame being reshaped. Depress button 3 and move the

cursor to reshape the frame. The frame will be defined and loaded with the file when button 3 is released.

The **close** command removes a selected frame from the **jim** layer. The file still exists as a UNIX System file; only the associated frame is shut down.

*To* **close** a frame:

1. Depress button 3, and select **close** on the menu.

2. Release button 3 (the cursor is now a target sight).

3. Move the target sight inside the frame to be closed.

4. Click button 3, and the frame disappears (or click button 1 and the **close** command is canceled).

   *Note:* The message *filename* **changed** will appear in the command line if changes were made to the file and not written. A second **close** selection will succeed.

The rest of the button 3 menu lists frame *filenames* that are available for editing. To work in a different file, select the *filename* from the menu. If the frame is already open, it is simply made the current frame, when selected. If the file is not open on the screen, the cursor will switch to a sweep cursor to prompt for a rectangle to be swept out with button 3.

The format of the lines in the menu is:

- Possibly an apostrophe, indicating the file (frame) has been modified since last written

- Possibly a period or asterisk, indicating the frame is open (asterisk) or the current frame (period)

- A blank that indicates a frame with no name

- The *filename* may be abbreviated, but the last component is always complete.

## Quitting Jim

The **q** command is used to quit the **jim** editor. Typing **q** in the command line may cause the **files changed** message to appear (a reminder files were modified and a write should be done). Typing a second **q** will blank out the **jim** layer and issue the message **jim: quit** and return to a UNIX System layer. The capital **Q** command ignores modifications and exits **jim** immediately.

See the **jim(1)** manual page in the *5620 Dot-Mapped Display Reference Manual* for detailed information.

## Command Line Diagnostic Messages

The following are command line diagnostic messages. An explanation of each and the corrective action, if required, are given for each.

### bad directory

Use the correct path name. Also, check directory access permissions.

### can't open *filename*

Illegal file is trying to be accessed or file does not allow read permission. Make sure the correct *filename* is being used in the correct working directory.

### file already exist

Message is displayed for attempts to write a frame with the name of an existing file in the current working directory.

### files changed

When using the **q** command, this message is issued as a reminder that file changes were made and not written. Either write the file or use the **q** again. A second **q** or **Q** command ignores previous file changes and quits immediately.

### file modified since last read/written

Changes were made to file in another layer.

### no file name

File cannot be written without having a *filename* assigned. Give the frame a *filename* by using the **f** or **w** command.

### --RE error: operand expected for *, + or ?

When searching for a string, precede the characters *, +, or ?, by a back slash ("\"). Otherwise, it will search for a regular expression.

### sorry; can't edit huge selection

Selected text is beyond the area of the frame.

### *string* not found

The text string searched for was not found.

### syntax

An illegal command entered. Usually happens when **ed** instead of **e** is used to open a file for editing.

### too many files open

Message is displayed when too many files are open. Number of frames open and the size of their files are determining factors.

### UNIX message unknown?

A message was written to your **jim** layer.

### warning: *filename* already loaded

Message is displayed if a file is loaded into a second **jim**.

### warning: last char not newline; wrote *filename*

In the frame, make sure the text cursor is on the last blank line by pressing the RETURN key at end of last file line; then write the file again.

### write may change good file

This message is used as a warning when a **write** command is requested and two frames have the same *filename*. One will be overwritten.

### wrote *filename*

The file in the current frame was written as requested.

### you typed: *repeat of your typed input*

The typed input is not acceptable.  Use the correct command input.

## JIM.RECOVER - INTERACTIVELY RECOVER LOST FILES

If **jim** is exited abnormally, the DMD will attempt to create a file called **jim.recover** in the $HOME directory. The **jim.recover** program is then used interactively to recover the files if desired.

*To use* **jim.recover** *type:*

**jim.recover [-m] [-f]** [*file_names*]

where the -m option looks only at files modified since the last write command; -f option forces all files to appear as if they were written. If a file name is specified, only that file will be considered. The default is for all files to be considered.

See the **jim.recover(1)** manual page in the *5620 Dot-Mapped Display Reference Manual* for detailed information.

# Chapter 6

# PRINTER OPERATION

**Chapter 6**

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# PRINTER OPERATION

## INTRODUCTION

This chapter shows you how to operate the DMD with printers. There are two ways that printers are used with the DMD:

Printer connected to the DMD

The TELETYPE 5310, TELETYPE 5320, C.Itoh 8510B, and Hewlett-Packard Thinkjet* printers connect directly to the printer port on the rear of the DMD. This type connection allows printing of the DMD screen and files from the host. The DMD software used for this feature is **dmdp**.

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\*     Registered trademark of Hewlett-Packard Co.

Printer connected to the 3B2 Computer

DMD commands are available for use on the 3B2 Computer. This allows DMD screen data to be printed on a dot-matrix printer (C. Itoh 8510B) connected to the 3B2 Computer. The DMD software used for this feature is **screendump**, **bcan**, and **lpg**.

## DMDP PROGRAM - INITIAL PRINTER SETUP

The locally attached printer should be connected to the "send only" printer port (Port B) on the back of the DMD. Port B must be set to 9600 baud through terminal setup (see your *5620 Dot- Mapped Display Terminal Owner's Manual*).

It will be necessary to option your printer before using **dmdp** for the first time. Printer options for the supported printers follow. Options are broken into four classes: Mandatory(MAN), Recommended(REC), Optional(OPT), and Not Applicable(N/A). Mandatory options must be set as specified for proper operation of **dmdp**. Optional options can be changed at the user's preference, where the supplied option is the most common default.

Consult the manual which came with your printer for further information about how to set options.

## OPTION SETTING FOR SUPPORTED PRINTERS

### TELETYPE 5310 and TELETYPE 5320

Options for the TELETYPE 5310 and TELETYPE 5320 printers are set with the LCD display and buttons on the front of the printer. These two printers are listed together because their options are identical.

> *Note:* TELETYPE 5310 and 5320 printers manufactured prior to February 1985 (bearing serial numbers 53P 1xx AAA) require a printer firmware upgrade to achieve full compatibility with the **dmdp** printer program. Without the upgrade, the printer will operate with full functionality only in the **Host** mode. To upgrade your TELETYPE 5310 or 5320 firmware, contact your Teletype sales representative and request upgrade kit  # 430972.

| | | | |
|------|------|------|---|
| CPI  | 10   | OPT  | |
| LPI  | 6    | OPT  | |
| FLGT | 66   | OPT  | |
| LMGN | 1    | --> | MAN for **Screen** printing, OPT for **Host**. |
| RMGN | 80   | --> | For 5310, or 5320 with narrow paper, |
|      |      | --> | MAN for **Screen** printing, REC for **Host**. |
|      | 132  | --> | For 5320 with wide paper, |
|      |      | --> | MAN for **Screen** printing, REC for **Host**. |
| TMGN | 1    | OPT  | |
| BMGM | 66   | OPT  | |
| CHAR | ASCI | OPT  | |
| ALTF | LINE | OPT  | |
| WRAP | YES  | OPT  | |
| PCTL | NO   | OPT  | |
| EMUL | ANSI | MAN  | |
| VIEW | MAN  | REC  | |
| LFON | NO   | MAN  | |
| CRON | NO   | MAN  | |
| CLHT |      | N/A  | |
| CLVT |      | N/A  | |
| HTAB |      | N/A  | |
| VTAB |      | N/A  | |
| CMOD | NOMD | MAN  | |
| PRTY | ODD  | MAN  | |
| BAUD | 9600 | MAN  | |
| FLOW | NONE | REC  | |
| SRTS | EIA  | MAN  | |
| DC24 | NO   | MAN  | |
| DALM | NO   | OPT  | |
| DEOT | NO   | OPT  | |
| LP   | NO   | OPT  | |
| ECHO | NO   | MAN  | |
| RTRN |      | N/A  | |
| AUT1 |      | N/A  | |
| AUT2 |      | N/A  | |
| AUT3 |      | N/A  | |
| AUT4 |      | N/A  | |
| AUT5 |      | N/A  | |
| AUT6 |      | N/A  | |

Note that the printer is being optioned for 7 bits/char and odd parity whereas the terminal setup only allows Port B to be set to 8 bits/char and even parity. This apparent inconsistency is not an error since the **dmdp** printer program internally translates between the two modes.

### C. Itoh 8510B

Options for the C. Itoh 8510B are set by changing two sets of dip switches inside the top of the printer.  One set of switches is on the right near the front of the printer, and the other set is on the right near the back of the printer.

| | | | | | | |
|---|---|---|---|---|---|---|
| SW1 - 1 | OPEN | OPT | | SW22 - 1 | OPEN | MAN |
| SW1 - 2 | CLOSED | OPT | | SW22 - 2 | OPEN | MAN |
| SW1 - 3 | OPEN | OPT | | SW22 - 3 | OPEN | MAN |
| SW1 - 4 | OPEN | OPT | | SW22 - 4 | DON'T CARE | |
| SW1 - 5 | CLOSED | REC | | | | |
| SW1 - 6 | CLOSED | OPT | | SW23 - 1 | CLOSED | MAN |
| SW1 - 7 | CLOSED | N/A | | SW23 - 2 | OPEN | MAN |
| SW1 - 8 | OPEN | MAN | | SW23 - 3 | OPEN | MAN |
| | | | | SW23 - 4 | OPEN | MAN |
| SW2 - 1 | CLOSED | OPT | | SW23 - 5 | CLOSED | MAN |
| SW2 - 2 | OPEN | MAN | | SW23 - 6 | DON'T CARE | |
| SW2 - 3 | OPEN | OPT | | | | |
| SW2 - 4 | OPEN | OPT | | SW24 - 1 | CLOSED | MAN |
| SW2 - 5 | OPEN | OPT | | SW24 - 2 | OPEN | MAN |
| SW2 - 6 | OPEN | MAN | | SW24 - 3 | OPEN | MAN |
| SW2 - 7 | CLOSED | OPT | | SW24 - 4 | CLOSED | MAN |
| SW2 - 8 | OPEN | MAN | | SW24 - 5 | CLOSED | MAN |
| | | | | SW24 - 6 | OPEN | MAN |
| SW21 - 1 | OPEN | MAN | | SW24 - 7 | OPEN | MAN |
| SW21 - 2 | OPEN | MAN | | SW24 - 8 | CLOSED | MAN |
| SW21 - 3 | OPEN | MAN | | | | |
| SW21 - 4 | OPEN | MAN | | | | |
| SW21 - 5 | DON'T CARE | | | | | |
| SW21 - 6 | OPEN | MAN | | | | |
| SW21 - 7 | OPEN | MAN | | | | |
| SW21 - 8 | OPEN | MAN | | | | |

### *Hewlett-Packard HP 2225 THINKJET*

Options for the HP THINKJET are set by changing the dip switches on the back of the printer.

```
SW1 - 1   DOWN      MAN
SW1 - 2   DOWN      REC
SW1 - 3   DOWN      OPT
SW1 - 4   DOWN      OPT
SW1 - 5   UP        MAN
SW1 - 6   UP        OPT
SW1 - 7   DOWN      OPT
SW1 - 8   DOWN      OPT

SW2 - 1   DOWN      MAN
SW2 - 2   DOWN      MAN
SW2 - 3   UP        MAN
SW2 - 4   DOWN      MAN
SW2 - 5   DOWN      MAN
```

Note that the printer is being optioned for 7 bits/char and odd parity whereas the terminal setup only allows Port B to be set to 8 bits/char and even parity. This apparent inconsistency is not an error since the **dmdp** printer program internally translates between the two modes.

## DOWNLOADING DMDP

The **dmdp** program runs only in **layers** environment and is loaded into a layer by typing:

**dmdp** *printer_type*<RETURN>

The *printer_type* argument specifies the type of printer attached to the DMD. Current printer types are:

- **5310** or **5320** for the TELETYPE 5310 or TELETYPE 5320 printers respectively.

- **8510b** for the C. Itoh 8510B printer.

- **thinkjet** for the Hewlett-Packard HP 2225 THINKJET printer.

- **transparent** for transparently sending input from the host, through the DMD, to any printer or other RS-232 device. When this option is used, the **Screen** option (below) will not be available. Input is transparently passed through the DMD to the RS-232 device with no processing of tabs, or insertion or monitoring of escape sequences. The host must insert delays, if necessary, to compensate for lack of flow control. The RS-232 device must be set to eight bits per character plus even parity.

> *Note:* The **transparent** option is intended for use with non-supported printers or other RS-232 devices.

After the program is completely downloaded, a picture of a printer will appear.

## USER INTERFACE

The **dmdp** program is menu driven.  There are two general types of menus: **action** menus accessible from button 3 and a **setup** menu accessible from button 2.  Action menus are used to initialize the DMD for printing, and to start and stop printing.  Setup menus are used to set optional characteristics of the printer and the printed output.

The user is guided through a printing session by a successive series of action menus that enumerate actions which are valid at a given point in the session.  Messages will also appear at the bottom of the **dmdp** layer describing the current program state.

In order to view the messages at the bottom of the **dmdp** layer, the layer must be at least as wide as one-quarter of the screen.  Although the **dmdp** layer may be any size, a layer approximately one-inch high and as wide as one-quarter of the screen is ideal.  Experienced users may wish to make the layer smaller, in which case messages may be truncated.

The button 2 setup menu is only available before the printer is turned on; that is, before **Print** is chosen in **Screen** mode or **Printer On** is chosen in **Host** mode.  See ''BUTTON 3 ACTION MENUS'' on the next page.  The button 2 setup menu is not available if the printer type is **transparent**.

The exact contents of the button 2 setup menu will vary depending upon the printer specified on the **dmdp** command line, since some of the options are printer specific.  Setup options can apply to either **Screen** printing, **Host** printing, or both **Screen** and **Host** printing.  Each option in the setup menu is marked by an **(S)**, **(H)**, or **(SH)**, which specifies the printing mode(s) to which it applies.

## BUTTON 3 ACTION MENUS

Button 3 action menus are used to initialize the DMD for printing, and to start and stop printing. The highest level action menu is referred to as the **Main Menu**. As shown in Figure 6-1, sub-menus follow all menus for which additional operations can or must be performed.
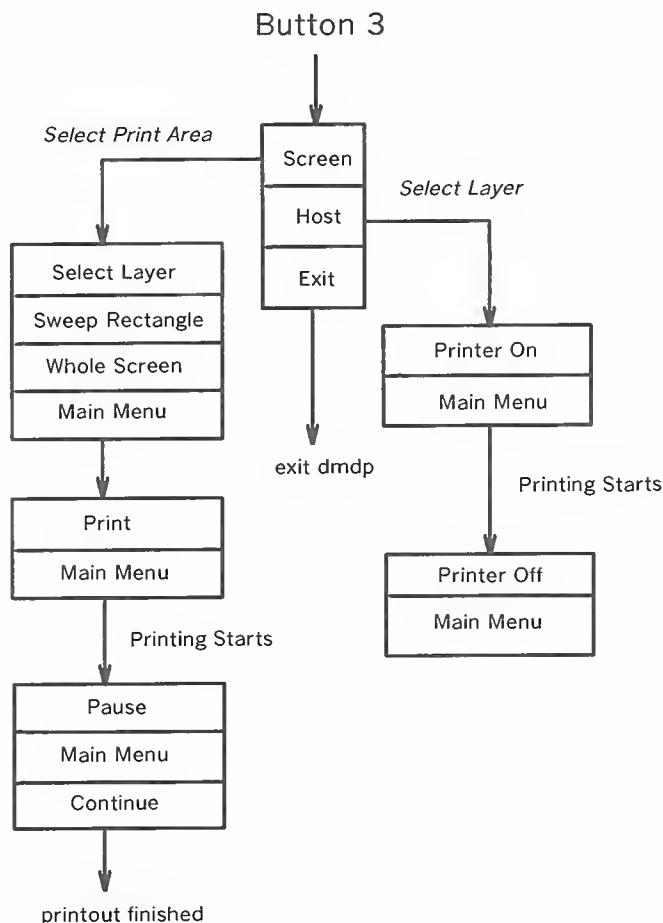
**Figure 6-1. Button 3 Action Menus**

After downloading **dmdp** and depressing button 3, the main menu is displayed. When printing is completed, the main menu will again be displayed. The main menu can also be returned to from any sub-menu by choosing the **Main Menu** option.

The main menu has three entries:

- **Screen**

  This is used to print a portion of the DMD screen.

- **Host**

  This is used to print incoming traffic from the host computer. It is usually used to print text.

- **Exit**

  This option will exit the **dmdp** program.

*The Screen Option*

**Printing Density Considerations**

Capabilities of different printers can vary greatly in a number of areas. Specific information about your printer's capabilities are discussed in the owner's manual for your printer. Screen printing density is an important printer specific consideration. The following discussion outlines this issue in general and how it is handled by the **dmdp** program.

There are 100 dots per inch, both horizontally and vertically, on the display screen of the DMD. Most printers do not support this exact printing density. Furthermore, many printers do not print the same number of dots per inch in the horizontal and vertical directions for all printing densities. In particular, many printers support more variation in

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horizontal printing density than in vertical printing density. When DMD screen data is being printed, one dot (or pixel) on the DMD screen is translated into one dot on the printed page. This mismatch of densities has a number of effects:

1. Distortion.

   When a printer is configured with unequal print densities in the horizontal and vertical directions, the image printed will be distorted along the X and Y axis. For example, a circle will appear as an oval. The **dmdp** program chooses default printer options that minimize such distortion.

2. Maximum printable width and length of the DMD screen.

   Depending on the specific printer, print density which is optimized to minimize distortion may have the side effect that an entire DMD screen width will be too large to fit onto a printed page. This is because optimal printing density is often lower than the density of the DMD screen. For example, if a printer only supports 75 dots per inch in the vertical direction, **dmdp** will select 75 dots per inch for the horizontal density as being the optimal density that will minimize distortion. Seventy-five dots per inch translates to 600 dots per line for an eight-inch printed page. The DMD screen has a density of 100 dots per inch or 800 dots across the full width of its eight-inch screen. It will only be possible to print 600/800 dots or 3/4 of the horizontal extent of the DMD screen on the eight-inch printed page.

   Analogous to the case for screen width, the entire length of the DMD screen will not always fit onto one printed page. However, **dmdp** will simply let long print areas continue onto a second page.

   When a screen area is chosen for printing, the area that will be printed at the currently set printer density is highlighted in inverse video on the DMD screen. Print density can be optionally changed if this default print area is not acceptable.

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3.  Size of the printed image.

    Another effect caused by mismatch of printing densities is that the
    size of the printed image can differ from its size on the DMD screen.

The key to obtaining a printed screen image without distortion and of the
proper size is to change the size of the image on the DMD screen.  This
can often be done by reshaping a layer before producing the picture to be
printed.  Aids for sizing graphical pictures to fit onto a printed page are the
**Show Printer Page** and **Reshape to Page** options described later in this
chapter.

### *First Level Sub-Menus under the Screen Option*

When **Screen** is chosen in the main menu, a sub-menu is available with
button 3.  This menu allows the user to select the area of the screen to be
printed.  When an area is selected, a number of actions occur:

1.  The area that will actually be printed becomes highlighted in inverse
    video on the DMD screen.  Note that the area to be printed can be
    smaller than the area selected because of differences in print density
    between the DMD screen and the printer.

2.  The **dmdp** layer itself becomes locked in the terminal and cannot be
    deleted until control is returned to either the main menu or this first
    level menu under the **Screen** option.  An attempt to delete the **dmdp**
    layer when it is locked in the terminal will be ignored, in the same way
    that an attempt to delete a current layer is always ignored by **layers**.

3.  If the area to be printed is contained within a single layer, all activity in
    that layer will be halted.

    If the area to be printed is not contained within a single layer, all
    activity on the DMD screen will be halted, and the entire terminal will
    be dedicated to **dmdp**.  This is done because a layer is considered to
    be an entity by the DMD, even if part of that layer is obscured.  When
    the area to be printed is contained within a single layer, the layer will

be printed (including obscured portions) rather than what is currently visible on the screen, so it is only necessary to freeze the layer. Printing a screen area that crosses a layer's boundary implies a request to print what is actually visible on the screen. It is, therefore, necessary to ensure that the contents of the screen are not changed while printing. This is done by dedicating the entire terminal to **dmdp** while this type of printout is occurring.

Note that when printing across a layer's boundary, since the entire terminal is dedicated to **dmdp**, the normal system menu is not available. Therefore, if button 3 is depressed when in this state, even if the mouse cursor is not inside the **dmdp** layer, the **dmdp** menu will be displayed rather than the system menu.

The first level sub-menu under the **Screen** option contains the following entries:

● **Select Layer**

Choosing this menu option allows a layer to be selected as the target area. When this menu option is chosen, the mouse cursor becomes a target sight. The target sight should be positioned within the layer to be selected, and then button 3 should be clicked.

When this is done, all activity in the chosen layer is halted.

● **Sweep Rectangle**

Choosing this menu option allows any screen rectangle to be selected as the target area. The method used to sweep the rectangle is identical to that of creating a new layer.

If the swept area is contained within a single layer, the chosen portion of the layer will be printed, and all activity within the targeted layer will be halted. If the swept area is not contained within a single layer, the chosen portion of the screen will be printed, and the entire terminal will

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be devoted to **dmdp** as described above. By definition, if the four corners of the swept rectangle are all inside the same layer, this is interpreted to be a request to print from the layer, including any obscured portions which may be inside the swept rectangle.

- **Whole Screen**

  This menu option selects the entire screen as the target area. This option is always interpreted to be a request to print from the screen rather than a layer, so the entire terminal will be devoted to **dmdp** as described above.

- **Main Menu**

  This menu option will return **dmdp** to the main menu.

### Second Level Sub-Menus under the Screen Option

After a screen area is chosen, a second level sub-menu is available with button 3. This menu contains the following entries:

- **Print**

  This menu option will cause printing to start. Remember that the area to be printed was highlighted in inverse video when the print area was selected. Slices of the highlighted print area will be changed to normal video just before output.

- **Main Menu**

  This menu option will return **dmdp** to the main menu.

### *Third Level Sub-Menus under the Screen Option*

When **Print** is selected, printing will begin. If button 3 is depressed before printing is completed, a third level sub-menu will appear. The entries on this menu are:

- **Pause**

  This option will cause printing to pause.

- **Continue**

  This option will cause printing to continue.

- **Main Menu**

  This option will return **dmdp** to the main menu. Note that this also has the effect of aborting printing.

### *The Host Option*

When the **Host** option of the main menu is selected, the mouse cursor becomes a target sight. The target sight should be positioned within the layer where input is to be printed, and then button 3 should be clicked. When a layer is selected in this manner, the **dmdp** layer becomes locked in the terminal and cannot be deleted until control is returned to the main menu. An attempt to delete the **dmdp** layer when it is locked in the terminal will be ignored, in the same way that an attempt to delete a current layer is always ignored by **layers**.

Once a layer is selected, there are two methods to enable the printer. After the printer is enabled, all input to the chosen layer will also be printed on the printer.

The first method is to send an escape sequence from the host to the chosen layer. This is useful for printing without having print commands

and prompts appear in the output. The escape sequences to turn the printer on and off are:

**Printer On - ESC[?4i**

**Printer Off - ESC[?9i**

The simple UNIX System shell script program **dmdcat** will turn the printer on, print files specified on the command line or data from standard input, and turn the printer off when it is done. The **dmdcat** command is discussed later in this chapter.

The second way to enable the printer is with the mouse. After a layer is selected for **Host** printing, a first level sub-menu is displayed the next time button 3 is depressed. This menu contains the following entries:

- **Printer On**

  This option will cause all input to the chosen layer to also be sent to the printer.

- **Main Menu**

  This option will return **dmdp** to the main menu.

When printing is in progress, a second level sub-menu is displayed if button 3 is depressed. This menu contains the following entries:

- **Printer Off**

  This option will stop input to the chosen layer from being sent to the printer. Control will be returned to the previous sub-menu, and the layer chosen when **Host** mode was first entered will remain chosen.

- **Main Menu**

  This option will return **dmdp** to the main menu. It will also stop input to the chosen layer from being sent to the printer.

Some preprocessing of data is performed by **dmdp** before outputting to the printer. Tab characters are automatically expanded to spaces, with tab stops every eight columns. Also, escape characters are filtered out. Escape characters are filtered because printers (as well as the DMD) use escape sequences, preceded by the escape character, as commands. Unintentionally sending an escape sequence can cause the printer to become confused. It may, however, be desirable at times to intentionally send an escape sequence to the printer. For this reason, if two escape characters are sent to **dmdp** in direct succession, this will be translated to one escape character and this character will be output to the printer.

In **transparent** mode, the **Printer On** and **Printer Off** escape sequences are not processed, tabs are not expanded to spaces, and escape characters are not filtered.

## BUTTON 2 SETUP MENU

The setup menu is used to set optional characteristics of the printer and the printed output. It also provides tools for sizing graphical pictures to fit onto a printed page. Logical default setup options are automatically set by **dmdp** when the program is first downloaded. When an option is changed, the change will be remembered for the current **dmdp** session but will not be remembered after **dmdp** is exited.

The setup menu is only available before the printer is turned on; that is, before **Print** is chosen in **Screen** mode or **Printer On** is chosen in **Host** mode.

The exact contents of the setup menu will vary depending upon the printer specified on the **dmdp** command line, since some of the options are printer specific. When a setup option consists of the choosing between a number of options, the currently selected option will be pointed to by an arrow (>). A different option can be selected by moving the mouse cursor to the desired option and releasing button 2.

The setup options follow. All of these options, except print quality and paper width, are applicable only to **Screen** printing. Print quality and paper width can apply to both **Screen** printing and **Host** printing. Each option in the setup menu is marked by an **(S)**, **(H)**, or **(SH)**, which specifies whether the option applies to the **Screen**, **Host** or both modes of printing respectively.

- **Show Printer Page**

  This option shows what part of the DMD screen will fit onto one printed page, both in width and length. It is intended to be used as a guide for shaping layers to match the size desired on a printed page. Current settings for printing density and paper width are taken into account. It is assumed that the size of the paper in the printer is 8 1/2 inches by 11 inches if the setup option **Narrow Paper** (below) is set or if the printer does not support wide paper, and 14 inches by 11 inches if the **Wide Paper** option is set.

When the **Show Printer Page** option is chosen, an outline will be displayed on the screen which will surround the area that will fit onto a printed page. The outline can be moved around the screen by moving the mouse. The outline will disappear when any mouse button is clicked.

If the entire width and/or length of the DMD screen will fit onto one page, the outline will appear at the edges of the screen.

● **Reshape to Page**

This option can be used to reshape a layer to the largest possible size that can fit on one printed page. Current settings for printing density and paper width are taken into account. If the entire width and/or length of the DMD screen will fit onto a printed page, the layer will be reshaped to the full width and/or length of the DMD screen, respectively.

When this option is chosen, the mouse cursor will be changed to a target sight. The target sight should be positioned within the layer to be reshaped, and then button 3 should be clicked.

As with normal reshape with the mouse, if there is insufficient memory available in the terminal to perform the reshape, the targeted layer will be reshaped to the smallest possible layer.

● **Centering**

The two choices are:

— **Center**

This means that the printed output will be centered in both the
vertical and horizontal directions on the printed page. In order for
vertical centering to work properly, the paper in the printer must
be form fed and adjusted to the top of the form before printing is
started. This means that the paper must be at the top of the
page when printing starts. In order for horizontal centering to
work properly, the paper in the printer must be centered properly.

— **No Center**

This means that the printed output will start at the left-hand
border of the page at the current position of the print head. This
may yield faster printing and is intended for draft copies.

● **Off-screen Copy**

The two choices are:

— **Off-screen Copy**

This means that **dmdp** will attempt to copy the screen area to be printed into off-screen memory before printing is started. Whether this copy succeeds depends upon the size of the area being printed, and the amount of off-screen memory being used for obscured layers. Note that this copy is much more likely to succeed on terminals with the 1-megabyte memory option. If the copy succeeds, all terminal operations are unlocked and everything can proceed as normal, including modification of the area being printed, while printing is occurring. The area to be printed, highlighted in inverse video, will be changed to normal video before printing starts.

— **No Off-screen Copy**

This means that no off-screen copy will be attempted, and that the progress of printing can be monitored by watching inverse video turn into normal video on the DMD screen.

● **Density**

This option will change printing density (Dots Per Inch) for the printer from the default value chosen by **dmdp**. The exact options depend upon printer type specified on the command line. If DPI is changed after a screen area has been chosen for screen printing and before printing is started, the highlighted print area may change to reflect the portion of the screen that can be printed at the chosen DPI.

Both types of density, horizontal and vertical, will be shown. If a printer does not support more than one density in either direction, it will still be shown for information purposes even though it cannot be changed.

The printing density menu entries for the TELETYPE 5310 and
TELETYPE 5320 are:

— **75 Horizontal DPI**

— **150 Horizontal DPI**

— **72 Vertical DPI**

— **144 Vertical DPI**

The printing density menu entries for the C. Itoh 8510B are:

— **80 Horizontal DPI**

— **96 Horizontal DPI**

— **136 Horizontal DPI**

— **72 Vertical DPI**

The printing density menu entries for the HP THINKJET printer are:

— **96 Horizontal DPI**

— **192 Horizontal DPI**

— **96 Vertical DPI**

- **Print Quality**

  This is used to set printer specific print qualities and can apply to both
  **Host** printing and **Screen** printing.  The exact options will depend upon
  the printer type specified on the command line.

Print quality is generally divided into two generic quality options: **Draft Quality** and **Final Quality**. In general, the tradeoff is print quality as compared to print speed.

Print quality for the TELETYPE 5310 and TELETYPE 5320 applies only to **Host** printing. **Screen** printing on the TELETYPE 5310 and 5320 is always done unidirectional, nonbold. For printing text with the **Host** option, **Draft Quality** refers to bidirectional, nonbold; and **Final Quality** refers to bidirectional, emphasized mode.

Print quality for the C. Itoh 8510B applies to **Screen** as well as printing text with the **Host** option. For **Screen** printing, **Draft Quality** refers to bidirectional, nonbold; and **Final Quality** refers to unidirectional, nonbold. **Final Quality** is recommended for **Screen** printing. For printing text with the **Host** option, **Draft Quality** refers to bidirectional, nonbold; and **Final Quality** refers to unidirectional, bold.

Print quality for the HP THINKJET applies only to **Host** printing. **Screen** printing on the HP THINKJET is always done unidirectional, nonbold. For printing text with the **Host**, **Draft Quality** refers to bidirectional, nonbold; and **Final Quality** refers to unidirectional, bold.

- **Paper Width**

    If the printer specified on the command line can use paper of different widths, this option will be displayed. The two options are:

    — **Wide Paper**

    — **Narrow Paper**

This is an option for the TELETYPE 5320. It applies to both **Screen** and **Host** printing. In screen mode, **Wide Paper** implies that the screen image should not be clipped to fit onto 8 1/2 inch paper. In the text mode, Wide Paper implies that the printer is set to 132 characters per line with 10 characters per inch, and narrow paper implies that the printer is set to 80 characters per line with 10 characters per inch. Note that this will not set the printer to wrap lines at 80 or 132 columns, rather it is used to tell **dmdp** how the printer has been set from the printer's front panel. This information is used by **dmdp** to calculate timing information.

## ERROR MESSAGES

The following is a list of error messages which may be displayed by **dmdp**. These messages are displayed at the bottom of the **dmdp** layer when the following exceptional conditions occur.  All of these error conditions have the effect of returning **dmdp** to its main menu.

- **Host: Input Already Diverted**

  This message can be displayed when attempting to choose a layer for **Host** printing after choosing **Host** in the main menu.  The **Host** option pipes data from the selected layer, through the **dmdp** layer, and back to the selected layer.  Data can only be piped through one layer.  This message says that some other program is already monitoring input from the layer being selected.  Most commonly, there is a second **dmdp** layer in the terminal which has already chosen the targeted layer for **Host** printing.

- **Host: Selected Layer Deleted**

- **Host: Print Layer Deleted**

- **Screen: Layer Deleted**

- **Screen: Layer Reshaped**

  All of these messages mean that the layer chosen for printing, either in **Host** or **Screen** mode, has been modified in such a way that the print session cannot continue.  No harm has been done except termination of any printing that has been started.

- **Screen: No Memory in DMD**

  The screen option requires a small off-screen buffer.  This message says **dmdp** was unable to dynamically allocate this buffer.  Reshape or delete a layer to free some off-screen memory and start again.

## ADVANCED DMDP USAGE

### Using Printer Features Not Supported by dmdp

The **dmdp** program does not attempt to support every feature of every individual printer, especially in regard to **Host** printing. This is necessary to keep the program as small as possible and to keep the user interface simple. Examples of printer features not supported by **dmdp** are the ability to print in different pitches, lines per inch, or fonts.

With the TELETYPE 5310 and 5320 printers, many of these unsupported features can be set from the front panel of the printer using the LCD display and setup buttons. With other printers, many of these unsupported features can be implemented by sending escape sequences from the host. A convenient way to do this is to modify the **dmdcat** shell script program. See "DMDCAT COMMAND" in the next section of this chapter.

As an example, a feature which might be useful is to print in compressed pitch, which allows printing of 132 columns on 8 1/2 inch paper. Inserting the command:

**echo " \033\033Q\r\c"**

in the **dmdcat** shell script, after the 'Printer On' escape sequence is sent and before text is printed, will change the **dmdcat** shell to a program which will print input in compressed pitch with a C. Itoh 8510B printer. Note that two escape characters are sent rather than one because **dmdp** will filter out the first escape character. Also note that the " \r" is sent to prevent **dmdp** from counting the characters in the escape sequence for tab expansion calculation.

### *Writing Printer Drivers for Unsupported Printers*

An important design feature of **dmdp** is a clean interface between generic and printer specific code within the program. This gives users the ability to write printer drivers for unsupported printers, as well as new printers that enter the market in the future. The **dmdp** printer drivers are loosely analogous to UNIX System device drivers. They are a collection of C Language subroutines which perform the **dmdp** printer specific tasks.

The directory **$DMD/src/dmdp** on the Core Utilities Source and Core Utilities Binary tapes or disks contains example printer drivers and documentation. The file **$DMD/src/dmdp/README** contains instructions about how to begin writing printer drivers. The Application Development Binary tape or disk must be installed in order to compile new printer drivers.

## DMDCAT COMMAND

This section describes **dmdcat**, a DMD host software program to be used in conjunction with the DMD printer support program **dmdp**.

**Dmdcat** will send data to a DMD terminal preceded by a **Printer On** escape sequence and succeeded by a **Printer Off** escape sequence. The escape sequences sent are:

- **Printer On - ESC[?4i**

- **Printer Off - ESC[?9i**

**Dmdcat** will print the concatenation of files specified on its command line, or its standard input if no files are specified.

**Dmdcat** has one option **-b**, which will strip back spaces from the output of **dmdcat**. If back spaces would result in two or more characters appearing in the same place, only the last character read will be output. This means that the printed output will appear exactly as it appears on the DMD screen, without bold and underline. This option is useful for printers which

either cannot process back spaces or are slow in processing back spaces.

See the **dmdcat** manual page in the *5620 Dot-Mapped Display Reference Manual* for more information.

# 3B2 COMPUTER PRINTER OPERATION

## Introduction

This section of this chapter describes how to use a printer connected to the 3B2 Computer.

## Screendump

The **screendump** command outputs portions of the DMD screen to a file or to the DMD printer. The screen portions can be the whole screen, a particular layer, or a selected area of the DMD screen. When the output is sent to a file, the **bcan** filter command formats the bit-map image of the screen.

### Command Description

To use the **screendump** command, you must log in on the 3B2 Computer, enter the **layers** environment, and create a rectangular layer about 2 inches high by 3 inches wide. You can make this dedicated layer smaller as you become more familiar with **screendump**. Now, enter the **screendump** command in the newly created, current layer by typing:

**screendump**<RETURN>

After a momentary delay, the layer will progressively change to reverse video as the program is downloaded from the 3B2 Computer. When the layer is finished downloading, it displays a small picture or *icon* of a printer.

You can create up to five other layers in the normal manner and make one of them current as desired. This ability allows you to have the DMD display what you would like to have printed.

When the **screendump** layer is current and the mouse cursor is inside the **screendump** layer, you can display two menus associated with buttons 2 and 3 of the mouse. By depressing and holding button 3, the following menu selections appear:

- **choose layer**

- **sweep rectangle**

- **whole screen**

- **exit**

To select one of these menu entries, simply move the mouse cursor over the menu until the desired entry is in reverse video and then release button 3.

If **choose layer** is selected, a target sight will appear. Move this target sight to the desired layer and click button 3. This layer is now selected.

If **sweep rectangle** is selected, a "sweep cursor" will appear. Move this cursor to a position where you would like a corner of the rectangle to start and depress and hold button 3. Then move the mouse until the desired rectangle is displayed and release button 3. The area of the rectangle is now selected. This procedure is identical to creating a new layer.

If **whole screen** is selected, the whole screen is selected immediately upon release of button 3.

If **exit** is selected, the **screendump** program is exited and the layer is available for other uses.

After the desired layer, rectangle, or whole screen is selected, you can use button 2 to perform operations on the selected area. By depressing and holding button 2, the following menu selections are displayed:

- **flip stipple**

- **reverse video**

- **halt/run**

- **write bits**

- **print bits**

To make a selection, move the mouse cursor until the desired selection is in reverse video and then release button 2.

If **flip stipple** is selected, the current screendump area has its stipple flipped or reversed.

If **reverse video** is selected, the current screendump area has its video reversed.

If **halt/run** is selected, the executing program in the selected layer is halted. The next time the button 2 menu is displayed, this selection will only display **run**. If **run** is then selected, the executing program continues. The next time the button 2 menu is displayed, the selection will be **halt**. This feature allows dynamic displays to be halted in order for them to be printed. This capability works only on individual layers.

If **write bits** is selected, the following command line is displayed in the **screendump** layer:

**File (BLITMAP):** ⌐ *filename*

At this point, you can depress carriage return and the file written will be

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called **BLITMAP**; or you can enter a file name of your choice, *filename*, and depress carriage return. After writing is complete, a message will be displayed as follows:

**Wrote** *filename*

This file can then be filtered with the **bcan** command and submitted to the UNIX System line printer spooler for printing. Refer to the *bcan* command below.

*Note:* When the **whole screen** is selected, wrap around will occur on the line printer spooler printout of the file. Therefore, you may want to create a large layer or sweep a large rectangle that is less than the **whole screen** size to avoid this wrap around.

If **print bits** is selected, the layer, rectangle, or whole screen will be printed on the printer connected to the DMD.

*Note:* Refer to the **screendump** manual page for the 3B2 Computer dot-matrix printer (C.Itoh 8510B) dip switch settings for this configuration.

## Bcan

The **bcan** command is a filter that formats a file to be sent to the 3B2 Computer line printer (lp). The printer must currently be a 3B2 Computer dot-matrix printer (C.Itoh 8510B). If the default spooling line printer is a 3B2 Computer dot-matrix printer (C.Itoh 8510B), the **lpg** command below can be used directly without using the **bcan** command.

### Command Description

The **bcan** command has three options available:

- -i  format the file for a 3B2 Computer dot-matrix printer (C.Itoh 8510B)

- -x  produce an ascii/hex representation of the file

- -r  produce a binary output.

Currently, only the -i option is useful. The format of the **bcan** command is as follows:

**$DMD/lib/bcan -i** *filename* > *filename.g*<RETURN>

If the default spooler line printer is a 3B2 Computer dot-matrix printer (C.Itoh 8510B), the file can then be printed by submitting the following command line:

**lp** *filename.g*<RETURN>

If the default spooler printer is not a 3B2 Computer dot-matrix printer (C.Itoh 8510B), but one is available on another port for spooling, the -d option of the **lp** command can be used. Refer to the *3B2 Computer Line Printer Spooling Utilities Guide* for more information. Refer to the *3B2 Computer Dot Matrix Printer Manual* for information on setting the printer dip switches for line printer spooling.

## Lpg

The **lpg** command outputs graphics to the system printer through the spooler. The default spooler line printer must be a 3B2 Computer dot-matrix printer (C.Itoh 8510B).

### Command Description

The **lpg** command is a shell script program that takes a filename passed as an argument and executes the **bcan** command with the -i option on the file. Then the standard output of the **bcan** command is redirected to the same filename with a **.g** appended to it. Next, the file with the **.g** appended to it is submitted to the line printer spooler. The following file representation of **lpg** shows this shell script program:

```
$DMD/libbcan -i $1 > $1.g
lp $1.g
```

The following illustrates the **lpg** command line:

```
lpg filename<RETURN>
```

where *filename* is the file that was written with the **write bits** menu selection of the **screendump** command.

# Chapter 7

# GETTING OUT OF TROUBLE

# Chapter 7

## GETTING OUT OF TROUBLE

Use this chapter if you find yourself in trouble.  To cure a problem, you
must first discover what the problem is (or if it really is a problem!).
Problems with the DMD terminal (or any computer gear) can be attributed
to one or more of the following:

- Operator error

- Transients

- Hardware failure

- Software failure.

# OPERATOR ERROR

This is the most frequent cause of problems. When you encounter a problem, check first that you did not cause it. Read the sections in this guide that relate to the procedure you were doing when the DMD failed. If you "follow the book" and still encounter a problem, there probably is a failure in the DMD or related hardware (modem, communication link, or computer). Follow through the procedure first, to eliminate the possibility of operator error.

Be sure the DMD is set up correctly. Check that the option settings are correct (baud rate, duplex mode, encoding, flow control, etc.). See the *5620 Dot Mapped Display Terminal Owner's Manual* for details.

# TRANSIENTS

The second highest number of problems that can occur are transient problems. Any one of the following could indicate a transient problem.

- "Garbage" appears on the screen.

- One layer fails (the others are ok).

- The DMD display unit screen and/or keyboard is "locked up."

## Lock Up

First, be sure that the DMD is really "locked up." It could be waiting for data from the UNIX System or waiting for a response from you. When using **layers**, you can find out by making another layer (remember six maximum) and listing the files (type: **ls**).

If you get an output, the DMD is waiting for input or output. If there is no output (after about a minute), or you could not create the new layer, the DMD is locked up. If you are in another DMD environment or program, check the cursor. An hourglass, coffee cup, or similar figure indicates that the DMD is waiting for input from the UNIX System. If the cursor does not move, does not display a menu, displays many menus, or has disappeared, the DMD has "locked up."

If the DMD "locks up," reset it by depressing the SHIFT and SETUP keys simultaneously. If in the **layers** environment, SHIFT/SETUP only kills the terminal end of **layers**, so it may be necessary to next hit DISCON/BRK to kill the host end. This action may cause a system log-off. If so, you must log back on the system. If you have a problem getting the program to download into the DMD, the UNIX System half of the previous UNIX System/DMD program is probably still running. Find out by typing:

**ps -u [your login name]**.

If any programs associated with the DMD are running (**layers**, **xt**, **jim**, **cip**, etc.), each must be terminated.

Type: **kill -9** [PID],

where PID is the process ID number of the program. If the DMD still does not download, there is probably a hardware failure.

If the DMD downloads correctly, the problem was caused by a transient. In the event that you get several transient problems, the problem could be in the hardware connected to the DMD (modem, data link, or computer) or by a power fluctuation. Transients in power systems are hard to track down, because they could be caused by ANY electrical device. Contact the responsible person(s) for repair.

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## One Failed Layer

If only one layer fails to respond to your actions:

- Make it the current layer (click **button 1** with the arrow inside the layer).

- Type in any UNIX System command.

- If you get output, there is no problem.

- If nothing happens, make another layer current; then **Delete** the "dead" layer with button 3.

## Garbage on the Screen

Garbage on the screen can be caused by a process left running when **layers** was exited or by noise on the communication link.

If you suspect the garbage is caused by a process running after the **layers** program has been exited, get the PID and kill the process (as previously explained).

If you suspect the garbage is caused by noise (DMD trying to convert noise into characters) on the communication link, or a bad port:

- Drop the communication link by logging off or performing a terminal reset (depress SHIFT and SETUP). It may be necessary to hit the DISCON/BRK key after a terminal reset.

- Log on another UNIX System or get another port on the present UNIX System.

- If the "garbage" stops, the problem is in the communication link, the computer modem, or computer port. Contact the appropriate repair personnel.

- If you still get "garbage," the problem could be in your modem.

- Swap modems with a similar one, then log on the UNIX System. If the "garbage" stops, the problem is in your modem. Contact the local repair personnel.

If you still get "garbage," you probably have a hardware problem.

## HARDWARE FAILURE

If you suspect a DMD hardware problem, perform the "self-test" by either turning power off and on or by pressing the SHIFT and SETUP keys. The self-test feature is explained in the *5620 Dot Mapped Display Terminal Owner's Manual*.

## SOFTWARE FAILURE

If you suspect a software problem, contact your System Administrator and explain the problem.

# Chapter 8

## OPTIONAL SOFTWARE PACKAGES AND DOCUMENTATION

**PAGE**

# Chapter 8

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## OPTIONAL SOFTWARE PACKAGES
## AND DOCUMENTATION

This chapter outlines optional application software packages and reference documentation for the DMD terminal, available from AT&T.

## DMD TEXT/GRAPHICS PACKAGE

The Text/Graphics Package software allows the user to enter, edit, format, and produce finished documentation for any purpose. The text processing programs access and interface with the UNIX System **nroff** and **troff** text formatters. Drawings can be developed on the DMD and included with the text to be formatted by the **troff** formatter on a phototypesetter. The formatted **troff** output may be reviewed on the DMD to check for errors and format details (without generating paper). This saves paper and the costs associated with the paper generation.

The following programs make up the Text/Graphics Package software:

- **cip** - interactive picture drawing program

- **proof** - phototypesetter simulator that accepts **troff** file format as input.

Details on features and operation of the Text/Graphics Package software can be found in the *5620 Dot-Mapped Display Text/Graphics Guide*.

# DMD APPLICATION DEVELOPMENT PACKAGE

The Application Development Package allows the DMD developer to create, edit, compile, debug, test, and install UNIX System/DMD software. This software package allows the DMD developer to design specialized application packages.

The Application Development Package includes:

- **dmdebug** - an interactive, menu-driven symbolic debugger

- **icon** - an interactive program to create and modify small cursor pictures

- **headers** - header files that define system constants, data structures, and macro contents

- **library** - several libraries of graphics functions and programming utilities

- A Software Generation System (SGS), which includes:

  — **dmdcc** - *C* Language compiler

— **m32as** - assembler

— **m32conv** - converts object files for different hosts

— **m32cprs** - compares object files

— **m32dis** - disassembler

— **m32dump** - dumps selected parts for the named object files

— **m32list** - produces a *C* Language source list with line numbers

— **m32nm** - prints symbol table of an object file

— **m32lorder** - generates an ordered list

— **m32size** - reports number of bytes of text, uninitialized and initialized data (and their sum) included in object file

— **m32strip** - symbol information stripper

Details for the use and operation of the development application programs are in the *5620 Dot-Mapped Display Application Development Guide.*

# REFERENCE DOCUMENTATION

## STANDARD DMD DOCUMENTATION

Hardware Information

- *5620 Dot-Mapped Display Terminal Owner's Manual* - contains hardware information and specifications for installation, maintenance, and setup of the DMD.

Software Information

- *5620 Dot-Mapped Display User Guide* -  contains basic operation of the DMD commands, and the basic UNIX System commands applicable to the DMD.

- *5620 Dot-Mapped Display Administrator Guide* - contains the information necessary for the UNIX System Administrator to install, configure, and maintain the UNIX System/DMD environment.

- *5620 Dot-Mapped Display Product Overview* - is provided for each software package release.  It contains highlights and information specific to the release.

- *5620 Dot-Mapped Reference Manual* - contains the UNIX System manual pages for the DMD software.

## OPTIONAL DMD DOCUMENTATION

Hardware Information

- *5620 Dot-Mapped Display General Technical Reference* - contains detailed hardware information.

Software Information

- *5620 Dot-Mapped Display Application Development Guide* - contains information for the development of new applications for the DMD. It is written for the experienced programmer.

- *5620 Dot-Mapped Display Text/Graphics Guide* - contains information for using the Text/Graphics Package.

See the *5620 Dot-Mapped Display Product Overview* for ordering information.

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